The Builder.

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The House of Lords on the Chantrey Bequest.

THE subject of the Chantrey bequest came before the consideration of the House of Lords on Tuesday last, on a resolution moved by Lord Lytton for the appointment of a Select Committee of the House to enquire into the matter, and, if necessary, to make recommendations. The motion was agreed to, apparently unanimously, though not without considerable difference among various speakers as to the general view of the subject.

We have already referred to Lord Lytton's recent article on the subject in the *National Review* as being logical and practically unanswerable, though we thought at the time that it was somewhat too polemical; and the tone and temper of his speech was more decisively so. He damaged his own case, as others of the Academy's critics have done, by exaggeration. To assert that the collection of pictures already purchased is "a mere by-word and a mockery," when the collection includes such works as Sir E. Poynter's "Visit to Æsculapius" and Brett's "Britannia's Realm," each of which might fairly be claimed as the finest picture its author has ever painted, is absurd and exaggerated. Still more so is it to assert that Millais' "Speak! Speak!", another of the purchases, is "the worst picture he ever painted." Even the worst of Millais is worth, for that matter, more than the best of many other painters; but to call that remarkable work his worst is mere temper or prejudice, and such assertions will not strengthen the hands of the Select Committee. Then we very much doubt whether the remark that no pictures by deceased artists had been bought is to the point. It is perhaps the one thing that is not made absolutely clear in Chantrey's will, whether he did or did not contemplate the purchase of works by deceased artists, as he did not in so many words prohibit it; but it seems to us unquestionable, from the general wording of the bequest, that what he contemplated was the purchase of new works of exceptional merit as an encouragement to English art; the object, as Lord Wemyss rightly said, was not to form a gallery but to encourage and stimulate English art; and with that object in his mind, no doubt the idea of the purchase of works by deceased artists was so far out of his thoughts that he did not see the necessity of even referring to it. We do not think that any logical and unprejudiced person could read the terms of his bequest without recognising that as their implicit and necessary intent; and therefore that part of Lord Lytton's argument is of no value. Nor can we doubt that Chantrey contemplated, as part of the use of the fund, the purchase of exceptionally good works by hitherto unknown artists. One or two at any rate of the small works contemptuously referred to by Lord Lytton would come under that category, and are purchases much more justifiable than he is aware of. The really unjustifiable selections are not so much among the works of artists unknown or little known before, as among the commonplace and uninteresting works of men well known—as mediocrities; some of them Academicians. It is among such that the real and formidable mistakes have been made.

Lord Lytton's ideas as to what the proposed Committee could accomplish are reasonable enough. It could secure from the Academy, he suggested, "some answer to the charges brought forward and some explanation of the methods hitherto adopted." And if it found the charges well founded, it could make recommendations which the Academy might be willing to carry out, and so put an end to misunderstandings. In fact, the Academy could easily have anticipated and rendered unnecessary the functions of the proposed Committee if they had chosen to do so. That any one should think the appointment of the Committee a necessity is entirely the fault of the Academy themselves. Individual Academicians, many of them, are most delightful and most reasonable people. But the Academy in its corporate capacity is one of the most self-opinionated bodies in existence. It will explain nothing and answer nothing, and treats all outside criticism as ignorant impertinence; and it is not surprising if public feeling is at last roused to some irritation at this defiant attitude. Lord Wemyss, in a speech intended to justify the Academy, said that so far from being opposed to an enquiry the Academy courted it. If so, why have they so obstinately refused to recognise any of the criticism directed against them, or to give any explanation of their action? This attitude of "courting enquiry" seems rather like making a virtue of what has at last become a necessity.

Lord Davey, who spoke as one of the present Chantrey Trustees, after repeat-

ing the statement that the Academy courted enquiry, also declared emphatically that the Academy were fulfilling the terms of the bequest in encouraging British art by purchasing able works by young and unknown artists. As already observed, we believe that was one of Chantrey's objects, shadowed forth in the terms of the bequest. But (only to quote two or three examples) it cannot be said that Mr. Pettie or Mr. Yeames were young and unknown artists, while it must be obvious that the works by them which were purchased were, to say the least, of very mediocre merit, while Calderon's "Elizabeth of Hungary," another purchase, is ridiculous and even worse.

Lord Windsor, in a well-considered reply on the part of the Government, admitted that a *primâ facie* case for enquiry was made out, and was of opinion that a Committee appointed by the House would make it perfectly clear that the Academy, in confining their purchases to pictures exhibited at their own annual exhibitions, were "taking too narrow a view of their duty and placing an unnecessary limit on their freedom of choice." That is at all events clear to every one. Reasoning from results, one would be inclined to say that there has been something more than that to complain of; that the Chantrey Bequest has been practically regarded as a kind of *bonne bouche* to be doled out to Academicians in rotation; A.'s picture being purchased one year, B.'s the next, C.'s the next; and so on in friendly rotation. If that has not been intended, the Academy have been unfortunate enough to give a good deal of excuse for such a supposition; and whether intentional or not, the result is obviously wrong and contrary to Chantrey's intention. In other words, if A.'s pictures were decidedly better every year than B.'s or C.'s, they ought to have been purchased every year, without any consideration of making things pleasant all round, which was certainly no part of Chantrey's object.

One curious feature in the debate may be noted—that neither those who attacked nor those who to some extent defended the Academy, seem to have had any perception of what is really the most serious fault in their administration of the Chantrey fund, viz.: their almost entire neglect of sculpture. This year they have shown signs of awaking to the fact, and have purchased an important piece of sculpture, though hardly one of the highest rank; but sculpture has been very much neglected. This is the more to be deprecated, because sculpture is one of the arts which is least understood and is most in want of encouragement in England; and the case for sculpture is certainly strengthened by the consideration that the founder of the bequest was himself an eminent sculptor. In this respect, even if in no other, the fund has been ill administered; and the mistake is only too characteristic of a body of whom the numerical majority are painters, and which is in fact not so much an "Academy of Arts" as an Academy of Painting.

VESTRY OFFICES, MEERSBROOK, SHEFFIELD.—New vestry offices, near Meersbrook Park, Sheffield, are to be opened shortly. The building has been designed by Mr. Joseph Norton, architect and surveyor, of Sheffield.

THE KINGSWAY UNDERGROUND TRAMWAY.

CONCURRENTLY with the formation of the new thoroughfares which are destined to connect Holborn with the Strand, considerable progress has been made in the construction of the shallow subway along which will be laid the underground tramway from the existing lines at Theobald's-road to the Strand. Although the temporary terminus of the new route will be at the latter point, the ultimate intention of the London County Council, subject to Parliamentary sanction, is to continue the line *vid* the Victoria Embankment and Westminster Bridge to form a direct connecting link between the northern and southern tramway systems of the metropolis. No useful purpose would be served by discussing the action of Parliament in refusing to accede to the wishes of the Council in this respect, but we may remark that those who are qualified to judge of such matters aver that it is impossible at the present time to convince either House that a tramway line of any kind would be a desirable adjunct to the Embankment. Moreover, the Commissioner of Police has openly expressed the opinion that the presence of tramcars on Westminster Bridge would cause great obstruction and constitute a source of danger to the public. For ourselves, we are convinced that the scheme of the Council would be of immense service to the community, and that no valid reason exists to interfere with its realisation.

The new route is to start at Theobald's-road, where a junction will be made with the existing lines by means of an incline in open cutting, with a gradient of 1 in 10 to the south end of Kingsgate-street, and for a short distance in two parallel tunnels. The lines will pass below Holborn in two cast-iron tubes driven by the shield system, so that no interference may be caused to traffic. South of the tubes the double tunnel is to be continued for a short distance, and thereafter the subway will consist of a single opening, now being constructed in open cut. Passenger stations are in course of construction at Queen-street, at the junction of Kingsway and Aldwych, and at the southern terminus of the line. The tramway is designed on the conduit system, and will be a double track line throughout. One very unfortunate mistake has been made by the Council, for which we scarcely think their professional advisers can be responsible. We refer to the fact that the height of the new subway is 3 ft. 6 in. less than that necessary for the accommodation of double-decked cars, such as are employed on all other metropolitan lines. It is a matter of opinion whether single or double-decked cars are the more desirable, but as the latter have been adopted elsewhere by the Council, it follows that passengers will have to change from one car to another at Theobald's-road, unless all vehicles running to that point are in future to be of the single-decked type. No doubt the cost of the additional depth would have been considerable, although small in proportion to the total expenditure; and further the advantage of the deeper subway would have been emphasised on the ultimate extension of the new route to the southern tramway system, where all the cars are double-decked.

In addition to the main subway, smaller subways are now under construction for the accommodation of gas and water pipes and other conduits. The concrete and mortar used throughout the works are made with Portland cement. No application appears to have been made of concrete-steel, by which considerable saving might have been effected. The whole of the underground work is lined with a layer of asphalt, ¾ in. thick, as a protection against water.

Operations have been somewhat delayed owing to the fragmentary manner in which it was necessary to conduct them as property was acquired from time to time. In several places work cannot be commenced or completed until more land has come into the possession of the Council.

Even with the limitations we have pointed out, the new subway will be of great advantage, and should be of much assistance to those upon whom will ultimately devolve the duty of considering the relative merits of different systems of locomotion for the metropolis.

HOLIDAY SKETCHES.

IT was a very happy idea on the part of the President of the Institute to ask for examples of "Holiday Sketches" to illustrate the walls on the occasion of his "At Home" at 9, Conduit-street last week. The result was a very remarkable collection of sketches by a number of well-known architects. Such a collection has hardly been got together in one room before, and it is to be regretted that circumstances did not admit of the drawings remaining there for two or three weeks, so that more people could have had an opportunity of seeing them. This, however, would have interfered with the immediate uses for which the rooms were required, and therefore they only remained up till after Monday night's meeting.

The term "Holiday Sketches" was evidently interpreted rather widely. What was really intended in the invitation, probably, was sketches actually made on a holiday or a sketching tour, which would hardly include some of the elaborately finished drawings exhibited; one was very glad to see these, but the main interest of the collection lay in the slighter drawings which were more obviously holiday work. Most of these, naturally, were of architectural subjects, but these were agreeably diversified by occasional landscape sketches, which showed the architect out of bounds and enjoying the beauties of nature rather than of art. Thus, a sketch by Mr. R. Blomfield labelled "Pershore" was no part of the Abbey architecture, but a charming sketch of the river and the lock. He contributed also a very able sketch of a sculptured figure from Fontainebleau. Mr. Leonard Stokes sent two or three admirable water-colour sketches of landscape, and Mr. J. W. Simpson a couple of small and delicate pencil sketches, one of them a scene in a wood; and Mr. Ernest George, along with

a large architectural drawing, sent a view of the Aletsche glacier.

Of the numerous and varied drawings of architectural subjects we have only space to notice a few specially. Among the first in the order of hanging Mr. Schultz's sheet of details of ancient Greek fragments was noticeable both for clear and precise drawing and for the admirable manner in which the texture and tints of the marble were conveyed by the brush. Mr. Maurice Adams's "Portico della Gloria, Santiago," in a very different style and medium, was one of the "holiday sketch" type, as, though quite complete in itself, it might have been, and probably was, drawn on the spot; it is a bold pencil drawing in thick strong lines. Mr. Arnold Mitchell's sheet of little pencil sketches, on the same wall of the room, showed what different results may be got with the same medium of execution, the pencil; these also were genuine holiday sketches. Among others in the same group were Mr. A. C. Blomfield's geometrical coloured drawing of a piece of ancient mosaic, and his sketch of part of the decorative work in St. Mark's (this we think has been illustrated in our pages); a coloured geometrical drawing by Mr. Lanchester of part of the Cordova mosque; a perspective washed drawing of the Bargello by Mr. Baggallay; a pencil perspective of Lyddington Bede House by Mr. R. S. Balfour; and geometric coloured drawings of a rood-screen by Mr. Greenslade. In fact, the row of drawings at the lower end of the large room formed almost a kind of epitome of the various methods in which architecture may be sketched and illustrated.

Among the other exhibits were a good many slight pencil sketches by Mr. Caröe, to which in some cases additional value was given by sketch sections of mouldings added. Mr. Aston Webb showed a pencil sketch of a street scene (Rouen ?) and two or three water-colour sketches of coast scenes at watering places, of which he has a large collection. Mr. R. D. Wells's slight water-colour sketches were very good, also Mr. Jerdan's in the same medium, free and effective though perhaps a little heavy in colour. M. Phenè Spiers illustrated old houses; Mr. Walter Millard gave us St. Mark's horses; Mr. Alexander Graham some bright water-colour sketches in the Mediterranean; Mr. Guy Dawber two excellent water-colour sketches of part of a Whitby street, and of the stone staircase at Castle Rising. Mr. Flockhart handles water-colour effectively in his interior of cathedrals; Mr. Emerson showed some powerful studies of Hindoo architecture in the same medium; and among the drawings in the back library were a few slight pencil sketches of architecture by Mr. J. Belcher, little more than outline, but admirable in their certainty of line. If we pass over many others, it is from no want of appreciation but of space. It was a most interesting and delightful exhibition.

ADDITION TO CHRIST CHURCH TOWER, WESTMINSTER.—The Bishop of London dedicated the completed tower of Christ Church, Westminster, on the 19th inst. The added portion of the tower has been built from the designs of Mr. G. A. Hall, architect, by Messrs. Trollope and Sons, at a cost of about 2,400*l*. It is in the Early English style.

NOTES.

The Board of Trade v. the Local Government Board.

THE recent Report of the Departmental Committee on the functions and organisation of the Board of Trade and of the Local Government Board, and the desultory debate on the same subject last week, were not of much value. Everyone knows that these two "Boards" are now fictions, and that the head of each Department is called respectively the President of the Board of Trade, and of the Local Government Board. What the country will gain by changing these names to those of Minister of Commerce and of Health, and adding two thousand a year to the salary of each Minister, is problematical. A larger salary to the chiefs will not make Consuls stationed abroad more efficient or prompt in the collection of commercial intelligence in foreign countries, or sanitary inspectors more active at home. There will be more uniformity in nomenclature and more truth in the title, but for practical purposes the change will, if carried out, have no value at all. There is, we think, at present something of a craze among officials for copying foreign names and systems. We confess to a partiality, partly antiquarian, for the existing titles, especially as they do not interfere with the work of the Departments; and, as taxpayers, we doubt if the country will get value for higher salaries to parliamentary chiefs.

Private Dwelling Houses.

A CURIOUS point has been raised in the case of Porter *v.* Gibbons and another. The landlord of a dwelling-house was seeking to re-enter the premises under a covenant in the lease which prohibited the tenant from underletting or assigning or to use the premises except as a private dwelling-house. The defendant admitted that certain cousins and friends had stayed in the house, contributing something to the expenses of the house. One visitor had remained some time, paying as much as two guineas a week. The Court, however, held that the right of re-entry was not enforceable under the covenant, since in the case of houses let as private dwelling-houses it must be shown that a business was being carried on upon the premises, whereas there was no evidence in this case that the defendant had made any profit or attempted to make profits in admitting relatives and friends on the condition of their contributing to the expenses. An attempt to make profits would appear very difficult of proof, but since these covenants are capable of being used very vexatiously, it is well they should not be too easily enforced.

The Woolwich Tunnel Scheme.

FOR some years past considerable inconvenience has been caused, not only to the working-classes, but also to tradesmen, shipowners, and the authorities of the Arsenal, by the interruption of the Woolwich ferry service, owing to fog and other causes. Taking the average of the last five years, it becomes evident that the service is temporarily stopped by fog on at least twenty-one days in every year, the actual figures ranging from five days to thirty-seven days. As fogs usually occur in the early morning, most of the hardship falls upon men, women, and girls who desire to cross the river to their daily work. Local dissatisfaction has assumed such dimensions that a Bill was promoted in the present session of Parliament with the view of obtaining powers for the construction of a railway beneath the river. Although approved by the inhabitants of Woolwich, this Bill was finally withdrawn by the promoters. The hopes of the inhabitants, on both sides of the river, rest, therefore, on the London County Council, by whom it is now agreed in principle that the time has come for the construction of a foot-tunnel at an estimated cost of 145,000*l*. Although this is a very modest outlay, it was decided at a meeting of the Council this week that the realisation of the scheme should be deferred until after the completion of the Rotherhithe tunnel and the new Vauxhall Bridge. If we may judge by the past history of the latter structure, North and South Woolwich will have to wait several years for their tunnel.

The Safeguarding of Lifts and Hoists.

MUCH valuable information relative to the construction, arrangement, and fencing of lifts and hoists is to be found in a Home Office report recently made by Mr. W. S. Smith. The subject-matter is separated into two main divisions of hoisting apparatus, and each of these is again subdivided for convenience into sections, wherein are considered, respectively, methods of construction and of safeguarding such appliances. Being written by one of the Government Inspectors of Factories, it is natural that this report should be concerned to a very considerable extent with such lifts and hoists as are used in various industries; but the matter presented forms a most useful collection of data, which ought to be in the possession of every architect and building contractor. We may especially direct attention to that part of the report which is devoted to automatic hoist doors, wherein will be found descriptions of the leading types of such devices. Safety-gear locking grips for starting ropes are also discussed in detail, and the report concludes with a *résumé* of the principal causes of hoist accidents and a summary of recommendations for the safe construction, fencing, and working of hoisting machinery. The pamphlet is completed by a series of forty-one plates, each containing an average of four or five diagrams showing details of construction. The report has evidently involved an immense amount of labour, and deserves the careful study of all who are concerned in the manufacture, application, and working of lifting and hoisting machinery.

Polyphase Electric Currents.

AN interesting paper by Mr. Brew, on "Three-Phase Working, with Special Reference to the Dublin System," is contained in Part III. of the *Journal* of the Institution of Electrical Engineers, which has just been issued. It will be remembered

that the Dublin Corporation, acting on the advice of Mr. Robert Hammond, built an electric generating station on Pigeon House Fort, and connected it with their central distributing station in Fleet Street, a distance of over three miles, by three-core cables suitable for conveying energy by three-phase alternating currents. The novel scheme has proved practically successful, and by using four-core cables as distributors a distinct economy in distributing the electric energy to the consumers has been achieved. The phenomena that Mr. Brew has noted in the working of the system prove that the modern theory of alternating currents is in very close agreement with facts. The "charging" currents of the cables were found to vary widely with the shape of the applied pressure wave, and the frequency of the alternating current in the fourth wire was three times and sometimes nine times that of the currents in the three cores. Mr. Brew's paper contains many suggestions, and gives many data which will be useful to electricians. There is one link in the chain connecting the lamps of the Dublin consumer with the generating station at Pigeon House Fort which we think is very clumsy, and that is the use of three single-phase transformers instead of a three-phase transformer. A three-phase mesh to star transformer can be manufactured, the design of which is theoretically perfect. It is much cheaper and more efficient than using three transformers. A transformer of this type seems exactly suited for the purposes of the Dublin transmission. Engineers are in the habit of settling a question of this type by reference to the opinion of continental electricians, who have had great experience in polyphase working. We would suggest that this is not a question for "authority," but one that can be definitely settled by elementary mathematics.

Barnet Isolation Hospital Competition.

THE reports of the meeting of the Barnet Joint Hospital-Committee in regard to the Barnet Isolation Hospital Competition are amusing reading. We have before referred to the case. The Committee in the first instance repudiated the idea of engaging a professional assessor, as waste of money; they could judge of the plans themselves. They seem very much gratified that, in spite of this, they have got fifty-one sets of plans; but we do not think they will find there is any architect of high standing among these competitors. Having gone over the plans themselves and selected five as the best, some of the Committee seem at the last moment to be nervous about spending public money on their own responsibility only, and suggest that an expert should be engaged to say which is the best of these five, with an apparent proviso that they need not take his advice. Another virtuous member thought that having advertised a competition without an assessor, it would be a breach of faith with the architects to appoint one now! One thing, however, none of them seem to perceive, viz., that it is a mere farce to choose what they think the five best plans themselves, and then call in an assessor to tell them which is the best of those five. If they admit that they cannot settle that for themselves, how do they know that they have selected the best five? No assessor ought to act unless the whole of the drawings are submitted to him; and no assessor whose opinion is worth having would consent to do so.

Dunstanburgh Castle, Northumberland.

THE ruins of Dunstanburgh Castle are comprised within the area of an estate extending over 4,000 acres near Embleton and Alnwick, recently held by the Eyre trustees, which will shortly be offered for sale at auction. The Castle, situated on a headland of basaltic rock to the south of Embleton Bay, was rebuilt as a fortress in 1315-6 under licence granted by Edward II. to Thomas Plantagenet, Earl of Lancaster and Lincoln, a grandson of Henry III. The enceinte, about 10 acres, known as Castle Green, stretches for a distance of some 400 yards from the gate-house on the south-west to the sea-front, where on the edge of the cliff is a massive wall. The great gate-house is flanked by two large towers, semicircular at the base and splayed to the square of the upper story; the towers and gate-house are pierced with lancet windows and cross-loops. The curtain walls, to the south and west, have towers and bastions; on the north side stands Lilburn's tower, square on plan, and having lofty turrets, small lancets, and two small projecting garderobes, one above the other, carried by corbels. The south curtain extends from the gate-house to a cove on the east side of the promontory, where stands Queen Margaret's tower on the foreshore; in that curtain is another rectangular tower guarding a sally-port. To the south of the Castle, of which the situation is very similar to that of its neighbour, Bamburgh Castle, is the deep cavern or chasm in the rock, called the "Rumble Churn." In a survey made for King Henry VIII. by Richard Bellasys and others in February, 1538, the castle is described as being "reuynus and of smalle strengthe." Duns Scotus, the learned Franciscan friar and theologian, was, it is generally believed, a native of Dunstance in Embleton parish; a pele tower, since incorporated in a private residence, long known as Dunstan's Hall or Proctor's Steath, is, reputedly, the place of his birth in or about 1265.

Institute of Painters in Water-colours.

THE present exhibition of the Institute of Painters in Water-colours is really what it professes to be on the title-page of the catalogue—an exhibition of "Studies and Sketches" by the members. It is well sometimes to have exhibitions of sketches as well as those of finished works; sketches in water-colour have their own special interest. The works of contributors are grouped together. Mr. G. C. Haitè comes nearly at the beginning of the list, with a series of eleven studies chiefly in Italy—impressions of colour effect mainly. Of Mr. Aumonier's ten sketches "The Citadel" and "A Green Avenue" are the most characteristic in subject and treatment. Mr. Walter Langley takes us to figure studies, groups of peasants or fishermen: "Interesting News" and "The Greeting" are the best of a very interesting set. Mr. Sainton exhibits nine silver-point drawings of fairies and other figures in his well-known and delicate style of work. Mr. E. C. Clifford's eleven frames include some charming bits of landscape and old buildings, especially "Spring at Kew" and "Camber Sands." Mr. Crompton shows among his set an effective sketch of the old timber bridge at Walberswick, and Mr. Huson has a fine set of sketches in the broad style of the old water-colour school; indeed "Across the Moorland" might almost pass for David Cox. A good many we must pass over for want of space; Mr. James Orrock sends a dozen sketches in his well-known wet-weather style, and Mr. Bernard Partridge some interesting figure studies, "The White Wrap" one of the best. Among the contents of the large room may be mentioned Mr. Graham Petrie's "Oleanders, Venice" and "The Harbour, Ragusa"; Mr. John R. Reid's set of nine drawings; Mr. J. Pedder's "Spring" and "Devonshire Primroses"; Mr. David Green's "Sea Breezes" and "The Dyke Bridge" among a set of fifteen; Mr. John White's set of twelve, all good; Mr. Joseph Knight's rather mannered drawings, of which however "The Vale of Llanwrst" and "Winter" are fine; Mr. F. G. Cotman's set of twelve; Mr. Frank Dadd's "Chance Acquaintance," a clever study of a soldier and a dog; and Mr. Bernard Evans's landscape sketches, powerful in effect but a little overstepping nature. Mr. John Fulleylove exhibits a dozen sketches, chiefly of the architectural subjects which he handles so well. Among the five by Mr. Frank Walton, "Epercherie Harbour, Sark," shows a most effective treatment of sea. Mr. Dudley Hardy's "Study for a Decorative Panel—Evening," a composition of dark trees and a couple of columns of a classic ruin, is a fine suggestion of the kind, and his various studies of single figures show much artistic feeling in line and colour, especially "The Red Rose." In the East Gallery Mr. Weedon is an exhibitor, and Mr. Thos. Pyne, and Mr. Claude Hayes, whose fourteen subjects contain much admirable work in a good and broad water-colour style, especially "On a Surrey Common" and "Near Guildford."

The Memorial to Mr. Penrose.

ON Saturday afternoon last some fifty or sixty persons, architects and others, were collected in the crypt of St. Paul's Cathedral to do honour to the unveiling of a memorial tablet to Mr. Penrose placed there, with the permission of the Dean and Chapter, by the Institute of Architects. Mr. Aston Webb, in a short introductory speech, pointed out that the position chosen for the tablet was an honourable one, inasmuch as it was placed back to back with the well-known tablet to Wren in the adjoining bay. Sir L. Alma-Tadema then made a brief but very comprehensive review of Penrose's character and work, and of what he had accomplished especially in elucidating the architectural practice of the Greeks. Sir Lawrence then unveiled the tablet, which bears the following inscription:—

"To the memory of Francis Cranmer Penrose, D.C.L., LL.D., F.R.S., F.S.A., Knight of the

Order of the Saviour in Greece. For 45 years Surveyor to this Fabric. President of the Royal Institute of British Architects from 1894 to 1896. Antiquary to the Royal Academy. Architect, Antiquary, and Astronomer. A profound Scholar. Author of *The Principles of Athenian Architecture*, whose distinguished services, in revealing the refinements of Greek architecture, are here commemorated by his professional friends and admirers. Born October 29, 1817; died February 15, 1903."

The inscription forms a very good summary of the varied accomplishments of Penrose (more varied than many who knew him only on one side were aware of), but we must regret that in a tablet erected by the Institute of Architects there should not have been at least a simple decorative treatment, analogous to that of the Wren tablet, instead of a mere framed slab like a school slate. Simplicity may be carried too far. Subsequently to the unveiling, M. Choisy made a few remarks in French, in appreciation of Penrose, and the short and very suitable service form provided at the Cathedral for such occasions was gone through. Among those present were Dr. Penrose and Miss Penrose, the son and daughter of the architect, Mr. Locke, the Secretary of the Institute of Architects, Mrs. Aston Webb and Miss Webb, Mr. J. MacVicar Anderson, Sir John Taylor, Mr. Blashill, Mr. Ingelow, Mr. Crace, Mr. H. H. Statham, Mr. T. H. Watson, Mr. Worthington, and others;

ARCHITECTURE AT THE ROYAL ACADEMY.—IV.

PERHAPS the most characteristic phase of present-day English domestic design, and the style which manifests the greatest individuality among the exhibits in the Architectural Room, is that of the smaller sized dwelling in which simplicity and a quiet restraint are striven for. There are various processes at work, such as narrow planning with its long simple roofs and a strict attention to a consistently *petite* scale; but the results are as much due to a keener appreciation and a more thoughtful application of material as to any other cause. We therefore find fewer kinds but larger masses of stone, brick, or rough cast walling and tiled roofing, and at the same time a growing disuse of mouldings and carved features.

The three country houses designed by Mr. Guy Dawber, and shown by charming pen drawings, are foremost in this group. "Bibsworth, Worcestershire" (1483), illustrated in our issue of May 14, 1904, is the most interesting and has stone coursed walls, stone slate roofs, and brick chimneys. A substantial feeling is given to the design by the regular massing of the larger parts, and little but bare necessity is present in the details. The entrance receives a slight importance by the introduction of a coping with finials to the porch gable, whilst tile verges only show in similar features elsewhere. The influence of the old Cotswold houses is clearly felt; and rightly so. Another house very much in the same manner is "Coldicote, Worcestershire" (1484), but this is hardly so satisfactory in its grouping and vigour. "Park Down, Surrey" (1486), has rough cast walls rising from a brick base and tiled roofs. The general appearance is that of a delightful home, planned in an L form. It is instructive to note that the author is careful to adapt his detail to the particular materials employed. "House at Munstead, Surrey" (1465 and 1488), by Mr. E. W. Mountford, is a design somewhat of the same type, but a little restless with bargeboards, half-timbered gables, and stone canted bays. The plan is H-shaped, rather wide in the centre. Some of the detail, notably the chimneys, is capable of improvement.

A form of plan very much resorted to consists of a central part flanked by wings set at an angle of 135 deg. or thereabouts, thus: ⌒. No. 1487, "House at Garn Hill, near Cardiff," by Mr. Carter, is arranged on these lines; the detail, however, has not advanced with the evolution of the plan, and belongs to a period of Victorian work when design was not of the best. "House at Edenbridge, Kent" (No. 1622), designed by Mr. R. W. Schultz, is all that can be desired. It is perhaps the most attractive house in the room, sympathetically drawn in coloured chalk. The materials intended to be used appear to consist of red brick to the ground story, tile hanging to the upper floor, and tiles on the roofs. There is breadth in the fronts, and the hipped gables as well as other minor details point to the desire to maintain the character of old Kentish work. The brick chimneys are planned to make dignified effects and enhance the interest of the design.

"House for a Painter" (1511) is an affectation in its essentials. The design is illustrated by two plans, clever in many respects, and a fidgety elevation; but the author, Mr. H. F. T. Cooper, has omitted scales and compass points, two omissions which bring doubts as to good planning to our mind. To the right of the entrance hall is "Visitor's bedroom," whilst from an inner hall ascends a large staircase to "The Painting Room" with which are arranged *en suite* "The Sleeping Room" and "The Bath." There are some working inconveniences in the minor parts. The plan lends itself to a grandiose treatment; but the elevation, called "The Front Aspect," does not rise to the occasion. No. 1517, a "House at Parbold, Lancashire," shown by a good water-colour drawing, has insufficient merit to warrant such a prominent position on the walls. Messrs. Everard and Pick send a line drawing of an admirable brick "House near Leicester" (1539) in which the prevalent ideas of restraint are maintained. The garden front is given, where it is seen that a large bay window with parapet is placed at each end, and the intervening space is finished at the eaves, provided with a cast-lead gutter. A simple roof crowns the composition and the detail is well suited to the materials. No. 1541 is an attractive ink sketch of "House and Gardens at Berkhamstead," in neither of which, however, are the intentions of the authors, Messrs. Mawson and Gibson, quite intelligible.

Mr. Reginald Blomfield is represented by "Design for Penn House, Weston, Bath" (1557), shown by three elevations, a section, and two plans; from the latter all information is withheld as to the nature of the various apartments, while the hatchings on the walls indicate a remodelling of an old house and not the erection of a new dwelling implied by the title. It is therefore fair to assume that the scheme was to a certain extent affected by existing conditions, but a careful examination of the drawings will prove that the author has produced an excellent design, presumably in local material. The rough cast and tiled "Cottage at Sunningdale" (1571), by Mr. Leonard Stokes, is a simple subject yet possessing considerable character. The irregular planning at the east end is interesting. The long broad roof running down to the ground story supplies valuable contrast to the well designed features which rise through it. "Proposed House near Brussels" (1585) is symmetrical in its fronts, but the interest is rather killed by the many materials which the author, Mr. W. C. Jones, has selected. No. 1587 is a view of a "House at Rugby" by Mr. J. W. Simpson. No plan is given, but it must be admitted to be a clever and well-studied piece of design, perhaps only marred by the bay window excrescence at the west end.

Mr. Ernest Newton exhibits another "House at Bickley, Kent" (1588), built in that delightful brick and tile manner which he has made his own. This excellent drawing appeared in our pages of May 14. Another contribution by the same author is No. 1586, "Lodge and Cottages at Overbury, Worcestershire," which seem to be built with the stone materials of the district. It is interesting to observe how the architect departs from the brick treatment to which we have just referred, and produces equally charming stone designs. The "House at Reigate" (1613), by Mr. T. P. Figgis, is a good composition shown by a nice coloured sketch. "House in Elsworthy-road, Hampstead" (1555), by Mr. Horace Field, is Georgian in feeling and a very excellent design, too. Another house in Hampstead is No. 1645, a Tudoresque brick and stone building by Mr. C. F. A. Voysey. The plans give a good deal of information, some of which is open to criticism; it is, however, gratifying to find this well-known designer emerging from the use of rough cast and the particular details with which he has long been associated. No. 1642 is a house of some importance at "Wolves Newton, Mon."; the design would appeal more to the spectator if the author, Mr. A. J. Hardwick, had appended a plan. Mr. Collcutt's design for a "House near East Grinstead" (1597) was published in our issue of November 7, 1903. Like the curate's egg, parts of it are excellent, but the curly lines in the drawing are worrying. "Wynn Lodge, Willenhall Estate, Barnet" (1651), is a tall-looking suburban house, the outcome of a square compact plan. Although cheaper, this is not an arrangement which lends itself to satisfactory elevations. That this is felt, is shown by the fact that the author, Mr. S. W. Cranfield, has put a gablet to add respectability to the length of the main ridge. Messrs. Mallows and Grocock send "Lodge at Pembury, Kent" (1659), which is a most interesting stone and timber composition shown in a good pencil sketch. The stone base adds largely to the pleasing result, and the external staircase is a happy note in the conception. No. 1660 is a design for "An Essex Vicarage" by Messrs. Freeman and Ogilvy. The drawing, in spite of the absence of plan, suggests a really good house; and an important point is the recognition of the brick and plaster tradition of the eastern counties. Mr. F. S. Chesterton contributes two sets of terraced houses, No. 1514, at Norbury, and No. 1629 Hornton-street, Kensington; both possess merit. The former is a welcome sign in the employment of an architect for the smaller classes of houses which have disfigured the metropolitan suburbs.

A large number of designs for business premises are exhibited, and they do not, taken as a whole, indicate any material progress in this kind of building. There is a lack of direct external expression of the purposes to which the structures are put. Take, for instance, the "Warehouse in Great Charles-street, Birmingham" (1441), by Mr. W. H. Bidlake. The immediate impression is that of a public institution. A heavy stone arcaded ground story supports two upper floors, the large brick piers of which stand most uncomfortably upon the arches below. There is no plan, but the drawing is good, although barely up to Academy strength. The "North-Eastern Railway Company's Offices in Westminster" (1437) are designed in excellent Georgian archæology, of which Mr. Horace Field is a capable exponent, but the domestic air of the front is scarcely representative of one of the great railway systems of the kingdom. No. 1457, "Warehouse and Offices, No. 20 and 21, Queenhithe, E.C.," is more to the point. The two lower stories in stone have a flat treatment, and the upper floors in red brick have recessed planes giving to the design some idea of the nature of the building. The "Greaves Pumping Station of the East London Waterworks" (1476), of which Mr. H. V. Ashley is the architect, is an excellent classic treatment for a work of this description. The "Post Office at Deal" (1477) is a clever application of Dutch architecture. The lower side gables have no visible use, and the windows of the sorting office seem quite inadequate. Mr. C. B. Hutchinson also shows the "Borough Offices" (1521) for the same town, designed in a similar manner; the reproduction, however, of features of a delightful period can scarcely be reconciled with the utilitarian necessities of this type of public building.

Mr. W. Campbell Jones exhibits two provincial bank buildings, both of which have good points. No. 1538 is at New Brompton in Kent, and 1535 is at Colchester. "Craven House, Kingsway" (1536) is the work of Mr. H. Tanner, jun. There is no plan of this building, but the front has considerable variety, which appears to be obtained at little inconvenience to the working of the parts. "Nos. 78-81, Fetter-lane, E.C." (1562), is a Flemish kind of stone front, with some good points in the design, of which Messrs. Treadwell and Martin are the authors. No. 1580 is a spirited sketch of a well-schemed public-house, "Cross Keys, Burnley," by Mr. J. Horsfall. "Bank Premises at Kettering" (1590), by Messrs. Gotch and Saunders, is drawn as though the front were applied to an old building; the design also suggests this, for there are no cornices or other evidences to the contrary on the returned ends. The chimneys rising from the front balustrade are unsatisfactory, and the two entablatures stretching across a small front of this nature are overdone. One of the best street fronts is No. 1610, "New Office Premises, Nottingham," designed by Messrs. Brewill and Baily, the salient feature of which is the steep pediment rising in front of a mansard roof. The scale and detail of the parts is most satisfying. "Kingsgate House, High Holborn" (1630), illustrated in our number of May 21, 1904, is an unorthodox street front, shown by an excellent

coloured perspective drawing. The architect, Mr. A. Keen, has introduced originality throughout the design, which in no way affects, but rather enhances, the practical points of the building. By way of criticism, we should say that the ground story is much too weak for the apparent work required of it; and although the side entrances complicate the planning, a more vigorous handling is possible. No. 1631, "New Premises, St. James's-street, W.," by Mr. L. W. Green, is in no way a desirable addition to the buildings of this important thoroughfare. No. 1658 is a scale drawing of the front of the offices of this Journal, designed by Mr. H. H. Statham, to which a sheet of mouldings and details to a larger scale is added. We may be allowed to express the wish that the authors of larger and more important fronts would add large-scale details to their drawings for exhibition, instead of depending merely on small perspectives or elevations. It would add to the interest of the architectural room.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

Alteration of By-law.

A SPECIAL general meeting of the Royal Institute of British Architects was held on Monday evening at No. 9, Conduit-street, Regent-street, W., to confirm, as required by clause 33 of the Charter, the resolution passed at the meeting of June 6 with respect to the addition to the first clause of by-law 3. Mr. Aston Webb, R.A., President, who occupied the chair, read the addition, as follows:—

"After December 31, 1906, every person desiring to be admitted a Fellow shall be required to have passed the examination or examinations justifying him as an Associate, or shall be elected from the ranks of the Associates. But in special cases the Council, by the votes of three-fourths of such members of the Council as are present and voting at a meeting of the Council, shall have power to dispense with such examination or examinations."

The addition having been agreed to, the special meeting then terminated.

Deceased Members.

The sixteenth general meeting (ordinary) was then held, when Mr. Alex. Graham, Hon. Secretary, announced the decease of L. C. Pedro D'Avila, Honorary Architect to the King of Portugal, Architect to the Government, Member of the Royal Academy of Fine Arts, Lisbon, who was elected an Honorary Corresponding Member of the Institute in 1900; and James William Brooker, elected an Associate in 1887, and a Fellow in 1892.

Mr. W. J. Locke, Secretary, said that as he knew M. Pedro D'Avila, perhaps he might be allowed to say a few words about him. The deceased gentleman was a man of the kindliest heart, and was always ready to do everything he could to advance the interests of architecture in Europe. M. D'Avila had attended every International Congress of Architecture—it was at the last two congresses that he (the speaker) had met him—and he put his services at the disposal of the Institute whenever occasion arose. The position of Hon. Corresponding Member of the Institute was regarded by him as one of the honours of his life.

New Members.

Some members attending for the first time since their election were then received, including the Rt. Hon. Lord Stanley of Alderley, who has been elected an Hon. Associate.

The Royal Gold Medallist.

The Royal Gold Medal for the promotion of architecture, conferred by His Majesty the King, was then presented to M. Auguste Choisy, Hon. Corresponding Member, Inspecteur-Général Honoraire des Ponts et Chaussées, Paris.

The President said—

It is, I think, a happy custom of the Royal Institute of British Architects to wind up its session by the most interesting event of its year, viz., the presentation of His Majesty's Gold Medal, and when (as to-night) the recipient attends in person to receive it the interest and distinction of the occasion is further increased. This medal, as you all know, is given by His Majesty, who graciously allows the Institute to recommend a recipient for His Majesty's approval, and it has become a custom to select one year an English architect, the next a foreign architect, and the third a literary man, whose work has made for the advancement of architecture. This year, accordingly, we considered the claims of literary men for this high honour, with the result that the Council and the general body of members of this Institute unanimously decided to recommend to His Majesty M. Auguste Choisy as the recipient of the medal; the royal approval was graciously granted, and M. Choisy is here this evening to receive the medal at our hands. There are no such things as politics recognised in this Institute, but I may perhaps be allowed to say that it is an event of happy augury that our choice should have fallen upon a Frenchman at this particular moment when our relations with that great and illustrious country are so friendly, and also that we have been able to come as unanimously to an agreement on the selection of a Royal Gold Medallist as these two countries have recently been able to do on matters connected with the highest State interests of these two great countries. We are further honoured this evening by the presence of a distinguished representative from the French Embassy in London, Comte de Manneville, placing, as it were, the official seal of approval of that country on our choice; and I cannot as your President let this occasion pass without expressing on your behalf, and my own, our unbounded admiration for the great band of artists in that country and the works they have produced in all materials for centuries. In architecture we recognise that they are still working on traditional lines, but at the same time in the modern spirit, and the close alliance of architecture, painting, and sculpture, as shown in their buildings, fills us with sincere delight and the highest respect and esteem.

It is, as you know, by no means the first time that we have recognised the genius of a Frenchman. This medal was awarded, in 1855, to M. Hittorff; 1861, M. Lesueur; 1864, Viollett-le-Duc; 1867, M. Texier; 1876, M. Duc; 1886, M. Charles Garnier; 1892, M. César Daly; but none, I think, have done more towards elucidating the modes of construction employed by the ancients than our guest of to-night, M. Auguste Choisy.

I could wish that the honourable duty of laying before you some short account of the work of M. Choisy were in more capable hands than mine, for I can make no claim to archæological learning which would justify me in presuming to review his work. It lies before you on this table to-night—some seven volumes, small in bulk; gigantic in labour, thought, and result. The names of these works have made M. Choisy famous wherever interest in such subjects is taken. They are *L'Art de bâtir chez les Romains;* 1873, *Le Sahara,* 1881; *L'Art de bâtir chez les Byzantins,* 1882; *Etudes Epigraphiques L'Architecture Grecque,* 1883; *Histoire de l'Architecture,* 1898, and *L'Art de bâtir chez les Egyptiens,* 1903, together with other smaller works. The first of these great works, therefore, was *L'Art de bâtir chez les Romains,* published in 1873; the last *L'Art de bâtir chez les Egyptiens,* which, as one may say, has put a crown to M. Choisy's life work, and was published so recently as last year.

In the art of building among the Romans, M. Choisy (and I am indebted to Professor Aitchison and to our Secretary, Mr. Locke, for much of this information) first introduced us to the Roman search for an economical method of building vaults and domes. Alberti had already discovered how walls were built by the Romans, but he went no further, and the great marvels of the building of vaults and domes were still undiscovered. He has shown us, amongst many other things, how experience enabled the Romans to abolish the open network which kept the green centring in place, and how to adapt a single brick for the thickness of these great vaults of 80 ft. span by inserting pieces of a second course to secure the corners at the junction, and by using the rubble or concrete filling in horizontal courses, the means probably adopted to equalise the pressure in the dome of Hadrian's Pantheon; all this is clearly shown in M. Choisy's illustrations. In his art of building among the Byzantines he shows how the Romans, with diminished means, were enabled to build vaults without centring. M. Choisy's great work, the *History of Architecture,* is a masterly exposition of the treatment of a subject from a single point of view. The result of fifteen years' strenuous labour, it is the history especially of architectural construction, from the earliest times to the present. The innumerable line illustrations are nearly all the work of his own hands, drawn for the most part in isometric perspective in the inimitable manner of the French draughtsman.

In his art of building among the Egyptians he has developed the theories set forth in the Egyptian section of his history, and concludes his researches into the methods employed for centring their great arches and in lifting their great monoliths. His work on Greek inscriptions contains a series of studies in Greek inscriptions in the arsenal of the Piræus, and the walls of Athens, and the Erectheum, and a marble slab was discovered with a complete specification for the building of the arsenal. A noticeable point in M. Choisy's work is the clearness and conciseness of his style; for what many would have taken three pages to describe, M. Choisy puts in three lines.

From this, necessarily brief and incomplete, account of M. Choisy's work, you will see that they are not merely historical accounts and records of buildings, but are the result of entirely original research and thought; and are, I take it, intended also to make the reader think out things for himself. They should be especially interesting to us English architects who are about to consider the question of architectural education, especially in connection with construction as the basis of design. For it is on account of these invaluable scientific researches into the history of architectural construction contained in these volumes that we are here to present M. Choisy with the Royal Gold Medal to-night. Perhaps M. Choisy will permit me to give a few personal details of his career. Born at Vitry-le-François, February 7, 1841, he early derived his taste for architecture from his father, an architect; and he was from the first struck by the relation between the scientific study of construction and the art of architecture. He entered the École Polytechnique and studied under Leonce Raynaud. In 1863 he joined the Government Department of the Ponts et Chaussées, where he was for many years Engineer-in-chief, but has now retired with the title of Honorary Inspector-General of the Ponts et Chaussées. After the publication of his first book, *The Art of Building Among the Romans,* his conclusions were felt to be so startling that, through the medium of Raymond and Viollett-le-Duc, he was sent on an architectural mission to apply the same system of investigation to the architecture of the Byzantine Empire.

For many years M. Choisy was a professor at the École des Ponts et Chaussées and at the École Polytechnique. In 1870, M. Choisy fought for his country in the terrible war of that time. In 1889 he was elected a honorary member of this Institute.

M. Choisy, allow me, on behalf of myself and my colleagues of this Institute, to congratulate you on the production of these epoch-making works and the honours you have received, and at the same time, as President of the Royal Institute of British Architects, to present to you this Gold Medal conferred by His Most Gracious Majesty the King on the unanimous recommendation of your British *confrères.*

[The President at this point presented the medal to M. Choisy.]

I trust that you may long be spared to enjoy the honours which have been the result of your loving and unsparing labours in the exposition of the great art of architectural construction.

M. Choisy, in response, said:—

Mr. President, ladies and gentlemen, I should be happy to express to you my gratitude in the language of your great nation, if I felt myself equal to it; but, unfortunately, I do not feel competent; so I shall ask you to allow me to give it in French.

La récompense que j'ai l'honneur de recevoir de vos mains, Monsieur le Président, dépasse toutes mes ambitions, et les témoignages de haute sympathie dont vous avez bien voulu l'accompagner me la rendent plus précieuse encore. L'annonce d'une telle distinction m'a semblé un rêve. Il m'a fallu relire le vote si bienveillant de l'Institut Royal, relire la sanction suprême dont Sa Majesté a daigné la revêtir; il m'a fallu vaincre le profond sentiment de de mon insuffisance, pour arriver à me convaincre que je pouvais être le titulaire de la Royal Gold Medal, pour penser que mon nom allait être inscrit à ce Livre d'or où figurent tant d'hommes illustres, la gloire de l'art britannique,

et cette élite d'artistes auxquels le R. I. tend une main confraternelle, sans égard aux nationalités et aux distances. C'est un admirable trait de cette noble et libérale institution de savoir ainsi s'élever audessus des distinctions de frontières ou d'écoles, et grouper en une grande famille ceux que rapproche la communauté des aspirations et le désir d'agrandir le patrimoine de l'art.

En ma qualité de Français je suis doublement fier de l'honneur que je reçois: j'y vois un nouveau et éclatant témoignage des franches sympathies qui règnent entre votre nation et la mienne; j'y vois l'expression touchante des sentiments que la population française a chaleureusement manifestés à Sa Majesté Edouard VII. dans une visite à jamais mémorable: ce sont les sentiments mêmes dont témoigne par sa présence le digne délégué du Gouvernement français, que je suis heureux de saluer dans cette enceinte.

Mes chers collègues, si je ne craignais d'abuser de votre trop indulgente attention j'aurais plaisir à réveiller ici quelques souvenirs qui comptent parmi mes meilleurs, parce qu'ils font remonter bien haut les relations entre le R. I. et celui qui lui exprime en ce moment son attachement sans réserve et sa profonde gratitude.

Avant tout, le souvenir de l'illustre et si regretté Penrose: J'osai, devant sa tombre même, rappeler l'émotion respectueuse que je ressentis en apercevant, grâce à des fouilles postérieures à ses travaux, les courbes de la plateforme de ce Parthénon qui est l'impérissable monument de sa gloire. Mon premier mémoire fut un hommage à votre immortel architecte; et aujourd'hui la récompense dont le R. I. m'honore grandit encore à mes yeux quand je songe qu'un tel homme l'a comptée parmi ses titres.

Si le R. I. fut le promoteur de mes recherches, un de ses membres dont l'amitié m'est chère en fut un des premiers confidents: M. Phénè Spiers a bien voulu, dans votre Journal même, consacrer une allusion charmante à ces féconds entretiens d'Athènes, où j'ai tant appris et puisé tant d'encouragements.

Un souvenir encore: Presque enfant, feuilletant les livres de la bibliothèque de mon père, j'eus la bonne fortune de rencontrer le Mémoire du Révérend Willis sur les voûtes du moyen âge. Ce fut une révélation: C'est ainsi, me dis-je, que les formes doivent être analysés; c'est ainsi que le dessin doit exprimer la structure. Et, lorsque j'essayai de résumer les procédés romains, j'eus sans cesse présent comme un modèle de méthode ce mémoire sans précédent, qui marque à la fois les débuts et le dernier terme de la critique architecturale.

Ainsi, dès mes premiers essais, c'est le mouvement imprimé par le R. I. que j'ai suivi: l'impulsion était vôtre; c'est au R. I. que je dois l'hommage des travaux dont il fut l'inspirateur. Maintenant, messieurs, l'honneur dont vous me comblez m'engage, et je tiens à reconnaître devant vous les obligations qu'il m'impose: tant que mes forces ne me trahiront point, j'aurai à cœur de répondre à un tel encouragement. Je voudrais éclaircir quelques points de cette théorie de l'art antique dont Vitruve est l'interprète; et, ici encore, pour mener à bien l'entreprise, je compte sur les lumières d'un maître pour qui Vitruve est l'objet d'un culte et dont les œuvres sont un reflet de l'hellénisme, M. le professeur Aitchison, mon éminent et vénéré ami.

Pardonnez-moi, messieurs et chers collègues, d'avoir parlé si longuement de moi-même; mais j'aurais cru manquer à la reconnaissance en négligeant de rappeler ce que je dois aux influences britanniques: aux membres du R. I. qui m'ont ouvert la voie, à ceux qui veulent bien m'y soutenir et m'y guider.

La distinction que je viens de recevoir couronne avec un éclat inespéré la plus longue partie de ma carrière; dans le chemin qui me reste à parcourir je crains moins les défaillances; il me suffira de lever les yeux sur la Royal Gold Medal pour me rappeler jusqu'à la fin qu'il me reste de sérieux devoirs à remplir, de nouveaux efforts à tenter si je veux parvenir à m'en rendre moins indigne. M. le Président et mes chers confrères, encore une fois et de tout cœur, merci.

Professor Aitchison, R.A., said that the President had done him the honour of asking him to say a few words on M. Choisy and his inestimable works. M. Choisy's first work, on *The Art of Building amongst the Romans*, was, to the best of his recollection, published in 1873. At that time the speaker was a member of a little architectural club called the Foreign Architectural Book Society, which was shortened, as is the custom in England, into its initial letters and was called "Fabs." During the time he was a member of that club, M. Choisy's work, *L'Art de Bâtir chez les Romains*, was passed round for the perusal of members. He read it through carefully, and came to the conclusion that one had come at last on the Columbus of ancient construction. The author was a man who had carefully examined every particle of evidence he could find in the buildings and ruins of antiquity, and had applied his extraordinary capacity of mind to reading the causes of the things that had happened, the causes of the particular form of construction that the Roman buildings had taken. One of the most brilliant intellects the modern world had seen, Leon Ba'tista Alberti, had also carefully examined the ruins of ancient Rome, yet, though he grasped the method of building the walls, he never was able to grasp the method that the Romans employed in building their vaults and domes. Here, however, in the case of M. Choisy, was a man who, with the data given, was enabled to construct mentally the way that the Romans had built their vaults and domes. He came to the conclusion that the Romans, when they were going to build on a large scale, cut down the nearest wood and used it for making the centring. Economy with them was important, as it is always with the architect. By using this green wood they saved considerably on the cost. But when it was put up in that green state, especially in a warm climate like Italy, it had to be kept rigid to prevent deformation by twisting and shrinking. They therefore laid a course of Roman bricks usually about 1½ in. thick. This alone did not appear sufficiently strong to support the weight of a vault that was to span 80 ft. To strengthen this they put tiles on edge, thus forming coffers, and by that means they kept the whole thing steady, and any slight shrinking of the portion below was practically of no consequence. They then filled this up with what we now call concrete, but which was in fact rubble. Small pieces of brick and stone and marble were used. They then shovelled on the mortar and put stones in by hand. After a time they became better acquainted with the strength of these bricks, and ceased to employ the coffers of bricks on edge. One course of these Roman tiles was put over, and where the four tiles met together they put a quarter of a tile over the junction, and they found that merely that inch and a half of brick would enable it to bear the concrete, or rubble, if this were put in horizontal courses. So they began from either side and put these courses on: as they got sufficiently set to admit another course it was put on, and so on till it came right across. The thickness was eventually made up to 5 or 6 ft., the usual thickness of these great vaults, and was tiled over to keep the rain from soaking in. Certainly, if these vaults of such a great thickness were carried up comparatively rapidly, so that the mortar had not quite set, there was a slight inclination to push out, and at the Basilica Maxentius, commonly called the Temple of Peace, or the Basilica of Constantine, there were brick flying-buttresses put up to restrain the spreading of the vault. M. Choisy had travelled extensively, and had had a most experienced and acute eye in seeing what was to be seen from the work done in old times. This he had compared with the work that was being done in primitive countries by the native masons themselves, without an architect, proving it to be merely traditional skill. He had put these together, and by the clearness of his mind and his capacity for reasoning he had found out how these large vaults were done by the Byzantines. They built out what we call a corbelled skewback on a wall, and as a slanted arch, and by carrying these on and putting brick after brick on they made the whole vault without a centre. The great dome of the Pantheon, we now know, could not have been earlier than the time of Hadrian, because M. Chedanne, by permission of the Italian Government, was enabled to cut out bricks from the foundation up to the ring of the eye, and every brick that was cut out was found to bear Hadrian's stamp. That showed it was not begun before his time, because the instant a new emperor was elected all the new bricks were made with his stamp. M. Choisy had shown there were settlements in the dome during its construction which caused discharging arches to be put in. The great disputes between the architects and engineers of the civilised world just before the building of the dome of Florence Cathedral, gave us some idea of what was generally thought, and Vasari told us that one of the engineers in particular said that the dome at the Pantheon was built on a mound of earth, that in putting in the earth and ramming it so as to take this weight they were said to have thrown in pieces of money, so that when the dome was sufficiently steady to allow of the removal of the earth, it would be taken away by the people for the sake of the money they would find buried in it. M. Choisy has given a long account of the Greek inscriptions, and also of the specifications that were found engraved for the Piraeus or the arsenal, and it showed the great care the Greeks took that everything they did to their public buildings should be as perfect as possible. But his last work on Egypt is perhaps the most interesting of all. There he tells us that the enormous stones of the Pyramids and pylons were carried up by means of staircases built in the crude brick, and that which we thought were the partial centres for semicircular arches were merely oscillating machines, which were put on the steps of these staircases, and tilted over by the weight of men hanging on to ropes, or by bars, and the stones put on these. These oscillating elevators could then be blocked up and gradually lifted up to the level, where the stones would be put on by hand labour. M. Choisy had published also an account of the forces acting one against another in the dome of Santa Sofia at Constantinople, and had given us some very interesting information as to the building of domes and spires in the East, where the masons of several neighbouring villages was got together at the same time for the purpose of holding the stones in their place till a key was made. M. Choisy is of opinion that something of that sort was done at Santa Maria dei Fiore at Florence. He (the speaker) could only say that when he came to the conclusion that he had found the Columbus of ancient construction he determined if possible to make his acquaintance. To say that M. Choisy was a very polite man was rather a slur on his countrymen, for the French were particularly distinguished for their politeness. But M. Choisy had, besides the politeness of the ordinary Frenchman, that admirable quality of giving you all the information he possibly could, and doing everything for you that you might want. He (the speaker) thought they ought not to let the evening pass without paying a compliment to their most gifted President. Indeed, he thought they ought to congratulate him on putting his final vote to this desire of the Institute that M. Choisy should have this recognition from His Majesty himself for his good efforts on behalf of our own art.

Sir L. Alma-Tadema, R.A., said that in thinking of his life and experience he had often remarked on the dispute between theory and practice. He was happy to think that the days were passed when it was thought that practice was practice and theory was profession, for theory without practice and practice without theory did not exist. One saw that practical education was gaining ground, and that no theoretical principles could be kept up if they were not supported by practical experience. We saw men come forward—like Quatremère de Quincy, who, being a sculptor, knew how theory could be made subservient to real serious work; like Viollet-le-Duc; and like M. Choisy, whose theory had been based on practice, and whose theories were so good because they were so practical. He had looked through M. Choisy's books and he found in them ideas so clear and simple that he could not help saying: "Why on earth did I not think of that myself?"

Mr. R. Phenè Spiers said it was a very great pleasure to him to know that a *confrère* whom he met nearly forty years ago, and who at that period had already shown extraordinary proofs of his genius, should come forward to receive the gold medal of the Institute. He remembered distinctly the first time he met M. Choisy; it was intensely hot weather, in August, in the Theatre of Bacchus, and it was very dry work. This Theatre had only lately been discovered. For years all the archæologists had pondered over its position, and it was not, he thought, till a year and a half or two years before he was there that some excavator happened to light on its pavement. He recollected this more especially because when he brought his drawings over here they were exhibited at

Conduit-street, and one of the older members, Professor Donaldson, saw for the first time that which he had dreamt of in his youth—that was to say, his (the speaker's) drawings were the first drawings of the Theatre of Bacchus for which Professor Donaldson had long sought the traces. It was in the Theatre of Bacchus, in 1866, he first met M. Choisy. They discussed various theories, and he found in his notebooks when he looked through them afterwards an entry to the effect that he had met a French gentleman on the site who seemed to have the most wonderful theories on every possible subject. On the following day he met M. Choisy again, and then he found he was a member of the French School at Athens, and they then had long talks about the school. He had seen M. Choisy's works and valued them since. *L'Art de Batir chez des Romains* he had studied with the greatest possible interest. It was followed by the Byzantine work, but he thought the one which filled him with the most delight was his clear and exact reading of the specification of the Arsenal of the Piræus. One of the subjects of which we knew very little, unfortunately, was the method by which the Greeks constructed their roofs. We have only the sinkings in which the joists or beams ran to guide us as to the size of those timbers, and as regards their construction we know scarcely anything. But that specification discovered in 1892, was translated by M. Choisy, who also made a conjectural restoration. It was open to anyone to compare M. Choisy's translation, or translate it himself if he liked, and then see his interpretation of it in the admirable conjectural restoration he had made. It was plain to every one; no one had contested it at all; it was accepted at once as the only true interpretation. His studies on the roof of the Erechtheum, were of extreme value and interest, and for these subjects we are greatly indebted to M. Choisy. But he had, in addition to that, published a work which it took a very long time to follow and to understand, because of the enormous range which it covered. His *History of Architecture*, ranging from the earliest times down to the century before last, was a most extraordinary work. In those two modest volumes M. Choisy gave a history which might have taken thirty or forty volumes. It was a most astounding work, and he (the speaker) sincerely hoped it would be translated into English, and form a standard of most extraordinary value, because at every moment it set the student reasoning for himself in order to follow the author's conclusions. That was one of the test points of education; we want men to reason for themselves and not simply to accept theories or formulæ.

Vote of Thanks to the President.

Mr. John Slater said that before the meeting separated he was quite sure it would be their wish to pass a hearty vote of thanks to the President on the occasion of his resigning the chair. There had been during the existence of the Institute many eminent Presidents, but he thought they would all agree that very rarely had they had a President who so combined in himself eminence as an architect and excellence as a President as did Mr. Aston Webb. They would all part with him as President with the greatest possible regret, and it was a source of grief to most members of the Institute that when a President resigned the chair he could no longer serve on the Council or give them the benefit of his advice except unofficially. They all wished Mr. Webb many years of life and prosperity, and that on the peaceful fields of art he would go on from victory to victory, for what he had done was only an earnest of what they expected him to do in the future.

Mr. H. H. Statham said he had been asked to second the resolution, and it was a great pleasure to him to have an opportunity of associating himself with what Mr. Slater had said as to the regard and respect which they felt for Mr. Webb, who combined so admirably practical knowledge with artistic feeling, and who as President had so well combined business capacity with courtesy and kindness.

Mr. Butler Wilson, President of the Leeds and Yorkshire Architectural Society, said that though he had not been asked to support the vote of thanks, yet, as a representative of an allied society, he could not let the opportunity pass without, on behalf of his own society and, he was sure, on behalf of other allied societies, saying that the provinces recognised the great services that Mr. Webb had given so liberally to his profession. Mr. Webb had instituted those "At Homes" which had given an opportunity for provincial members not only to meet each other but to meet the London members. Mr. Webb had also suggested the importance of opening the columns of the *Journal* more freely to reports of provincial meetings, and altogether he had expressed a most liberal view of the profession. He had gone hand-in-hand with the profession since the time he was President of the Architectural Association.

The motion having been very heartily agreed to,

The President, who was received with loud applause, said they had more than repaid him for the delightful times he had had with them for the last two years. It was twenty years since he first took some office in the Institute, and he thought he had filled every office since. When he was elected to the chair he made two promises. One was that he should make mistakes and that promise he had fulfilled. The other promise was that when he made mistakes that they would be from want of judgment and from a desire as far as possible to serve what he believed to be the interests of the Institute to the best of his ability. He was greatly indebted to other members of the Institute for their help. He was greatly indebted to his friend, Mr. Alexander Graham, the Hon. Secretary, who had given him the most loyal support; and to Mr. Locke, the Secretary, and to every member of the staff of the Institute. He was quite sure that no institution of that sort had ever been so well served, or could be better served, than was the Institute by the officers who were connected with it, and his thanks were greatly due to them. He was also indebted to the members of Council, every one of whom had extended to him great courtesy and personal kindness. He felt sure that in the future the new Council would extend the same kindness to his successor who, he was proud to know, was Mr. Belcher. The Institute was entering upon a somewhat difficult time, during which a considerable amount of care and consideration would have to be exercised by all those who had the direction of affairs, and they would all regret, he was sure, if anything should be done that would disturb the even progress and advancement which the Institute had shown. He was sure that the Institute had never stood better in public, in artistic, opinion than it did at the present time, and he hoped and believed that its position would be extended and increased; though he also believed that that could only be done by moderation. Towards the end of his presidency they had been engaged in the consideration of an important matter, but that matter had passed out of the hands of the old Council. He regretted, and they all regretted, the loss of many valuable members from that Council, and they looked to the new Council to carry forward the work in a way which would keep the Institute united if possible. Without that it was impossible for the Institute to do the work which it should do, and he was convinced, as a very old Institute man, that it was essential for architects that the Institute should be strong and respected both by members of its own body and by those outside it—not only by architects, but by the official and artistic world with whom they were brought into contact. That was a matter of politics. What they were all chiefly concerned in was the promotion of architecture and art—they should all try to do some little work to advance it.

The meeting then terminated.

THE GREEK PLAY AT BRADFIELD.

IT is four years since the open-air theatre at Bradfield College was filled with spectators to witness a Greek play; the performances are professedly triennial, but in 1900 the proper date of performance was anticipated by a year, 1900 being a special anniversary in the history of the College. On Tuesday last, under fine though not brilliant weather, the theatre was again occupied by fifteen hundred spectators, to witness the first of a series of five performances of the *Alcestis* of Euripides.

We have before described the theatre, which in its plan closely follows the traditional Greek theatre plan, even to the rather un-practical rounding of the auditorium into a horse-shoe curve, from the end seats of which little can be seen of the stage. The fact that this form of plan was accepted seems to imply that to the ancient audiences the chanting and the evolutions of the chorus were the really popular part of the entertainment. The audiences at Bradfield College, however, are not of the popular element, and accordingly the management, while presenting to us the complete lines of a Greek auditorium, restrict their invitations to 1,500 for a *cavea* which really holds 2,000; leaving the end seats of the tiers unoccupied.

Alcestis was the play given on the last occasion also; one is always glad to see it again, it is a play so full of that kind of human pathos which no alteration of time and country can dull the edge of. Indeed, the parting scene between the dying Alcestis and her husband and children is so touching that if acted with the power and pathos that grown-up actors of genius could put into it, one feels that it would perhaps be almost too heartrending to witness. To imply that the actors at the school do not put all into such a scene that it is capable of is no disparagement; it is only saying that they are boys or youths and not men and women, and cannot have the feelings of more matured natures; indeed the part of Alcestis herself, with its exquisite tenderness, could only be adequately acted by a woman, and a woman of genius. But Mr. Richards gave a very carefully studied and refined presentation of the part, which was highly creditable. The best and most complete piece of acting of the play was perhaps that of the part of Admetus, by Mr. Scott; but we should also mention the short part of Thanatos by Mr. Simcox, which was very cleverly done, and really conveyed something of the weird effect which the figure of Death as an actual personage on the stage ought to produce; when he disappeared through the doors of the palace one felt that an evil thing had entered into the house. Mr. Robinson's Herakles was not, we thought, equal to the bustling Herakles of a previous presentation; he played the part rather too slow, so to speak. An impressive moment in the play was when the dead Alcestis is carried out on her bier and the procession walks round the orchestra and out at the side-scene; the dead silence of the audience, and the almost noiseless tread of the actors in their antique robes, produced for the moment an impression as if one were witnessing a scene in a dream.

The music for accompanying the play is now in the hands of Mr. S. J. Rowton, who, we are glad to see, admits, in his preface, that if we could hear the music actually sung and played at Athens 2,400 years ago, it would probably be, to our ears, not musical at all. There is, in fact, a good deal of nonsense talked about Greek music, of which, in spite of learned theorists, we really know nothing with certainty, beyond the notes of the scale, which are not exactly the modern scale, though they were the basis of it. Mr. Rowton, therefore, did not attempt the impossible task of manufacturing Greek music, but gave us something which, while sufficiently agreeable to the ear, was old-world enough to deceive one into feeling as if it were or might be ancient Greek; which is all that can be done.

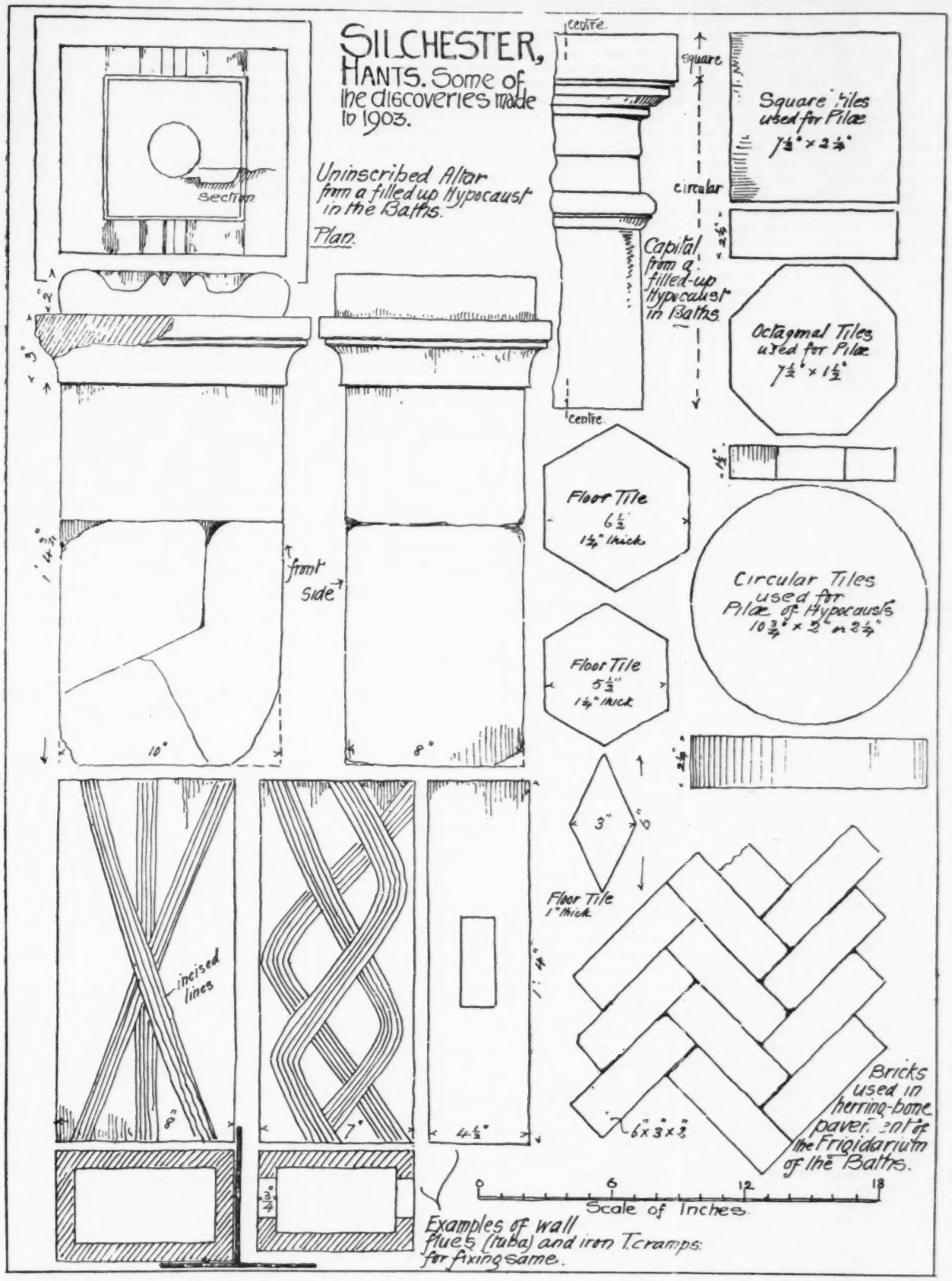
In contemplating such a play as *Alcestis*, so full of passion and dramatic contrast, one cannot help wishing that it could be acted in Greek by a company of eminent actors, if they would face the task of getting up the Greek. It would be a great spectacle.

The translation into English, made by various members of the Sixth Form at Bradfield, shows a great deal of literary merit in places; perhaps the criticism that might be made is that there is a little too much of literary merit in some portions of it—*i.e.*, that it renders the original into the language of modern feeling a little too much to correctly represent the Greek.

That is perhaps inevitable; we may act and see a Greek play in the original, but that does not make us Greeks; and, indeed, we never see the Bradfield play without a curious speculation as to the difference, in all its thoughts and habits and associations, between the audience which saw it originally in Athens in the Vth century B.C. and the audience which sees it in the XXth century A.D., in a Berkshire chalk-pit.

Too much cannot be said in praise of all the arrangements for the transit and the convenience of visitors. That is one of the minor sources of satisfaction in going to the Bradfield play—everything is so admirably managed.

H. H. S


SILCHESTER, HANTS. Some of the discoveries made in 1903.
Uninscribed Altar from a filled up Hypocaust in the Baths.
Section
Plan.
front
side
10"
8"
incised lines
8"
7"
4½"
centre.
square
circular
centre.
Capital from a filled-up Hypocaust in Baths
Square Tiles used for Pilæ 7½" × 2½"
Octagonal Tiles used for Pilæ 7½" × 1½"
Floor Tile 6½" 1½" thick
Circular Tiles used for Pilæ of Hypocausts 10¾" × 2" or 2½"
Floor Tile 5½" 1½" thick
3"
Floor Tile 1" thick
6"×3"×2"
Bricks used in herring-bone pavement of the Frigidarium of the Baths.
0 6 12 18
Scale of Inches.
Examples of wall flues (tubæ) and iron T cramps for fixing same.

SKETCHES FROM THE SILCHESTER EXHIBITION.

WE described briefly last week the objects from Silchester which are on view at the rooms of the Society of Antiquaries. We now give a few sketches made from the collection.

THE BRITISH ASSOCIATION OF WATER-WORKS ENGINEERS.

THE annual meeting of the British Association of Waterworks Engineers was continued in the Council Chamber of the Town Hall, Hull, on Friday, June 10, Mr. F. J Bancroft, President, in the chair.

Air-lift Pumping Plant.

Mr. J. W. M. Richardson, Assoc.M.Inst.C.E., read a paper on the efficiency trials of air-lift pumping plant for the Corporation of Birkenhead. He said that in March, 1901, the Gas and Water Committee of the Birkenhead Corporation had to consider the question of taking immediate steps to increase the water supply in the area under their control. They had at that time a site known as the Ford Pumping Station, upon which was situated a borehole 800 ft. deep, 31 in. diameter for a depth of 150 ft. below the surface, and 24 in. diameter for the remaining depth, passing through marl beds for a distance of 765 ft. below the surface, and into the new red sandstone for a further depth of 35 ft. Between the marl beds and the sandstone a large fault was met with, and until this was reached no great quantity of water was obtained.

At the date mentioned, an old single-cylinder horizontal engine, with a pump of the ordinary type at a depth of 190 ft. below the surface, and capable of pumping about 3½ million gallons per week, had been installed for testing purposes. On the advice of the late Mr. W. A. Richardson, the committee decided to put down an air-lift plant for permanent use. The principal factors leading to this decision were the short time in which an air-lift plant of the required capacity could be delivered and erected, and the possibility of erecting the first set of plant previous to removing the old one.

The reservoir and tank at Flaybrick Hill, to which the water had to be conveyed, being about a mile from the pumping station, and at an elevation of 200 ft., force pumps had to be provided in addition to the air-lift plant, and tenders were invited for the delivery and erection of a duplicate air-lift and force-pump plant, each set having a capacity of 45,000 gallons per hour lifted from the bore-hole into a tank at the surface, and thence into the tank at Flaybrick Hill, the tender of Messrs. A. F. Craig and Co., Limited, of

Paisley, being accepted. The air-compressor cylinders were 12 in. and 24 in. diameter respectively for the high and low pressure air, and 15 in. and 28 in. diameter for the high and low pressure steam, and having a stroke of 30 in., were cross compound, and mounted on hollow cast-iron bed-plates, one for each line of the engine, the centres being 7 ft. apart. The air-cylinders were in front of the steam-cylinders, a piston rod 3 in. diameter passing through both to the cross-heads. The steam cylinders were fitted with ordinary flat surface slide valves, the high pressure having cut-off expansion gear. No steam jacketing was provided, but the cylinders were lagged with mahogany and sheet steel, with non-conducting composition underneath, and a 1½ in. valve was provided between the steam chest and the cylinder on the high-pressure steam cylinder for warming up and starting purposes. The air cylinders were water jacketed throughout. Between the low-pressure air discharge and the high-pressure air suction, an intermediate receiver 15 in. diameter by 8 ft. 6in. long, fitted at a height of 5 ft. 4 in. above C.L. of engine, and contained a water coil for cooling purposes, consisting of 82 ft. of 1¼ in. bore, malleable iron pipe, with connexions through the end covers. The suction valves for the high-pressure air-cylinder were four in number, and were fitted on top of the cylinder, two at each end. An air-space, 6 in. by 2½ in., was cast along the top side of the cylinder in communication with the intermediate receiver, and acted as a casing for the valves, which were accessible through cast-iron screw plugs 4 in. diameter. The valves were of steel with gunmetal seats screwed into the cylinder body, and are fitted with springs and adjusting nuts for regulating the tension. Collars were keyed on to the valve spindles, which allowed the valves a lift of $\frac{1}{16}$ in. Perforated plates were fitted to the recesses on the cylinder covers, to act as guards, and prevent anything falling into the cylinders in case of a broken valve. The high-pressure air-discharge valves were of the barrel pattern, 2½ in. diameter, and having four bearing strips which keep the valve central on its seat. The barrel portion of the valve was 2½ in. diameter, and, with the exception of the strips, which were ¼ in. wide, a clear space of ⅛ in. all round the valve was available as air space. The valve seat was 3¼ in. above the bottom of the barrel, and the pressure of the spring which closed the valve was applied internally at the bottom, thus ensuring the valve returning properly to its seat after each lift. The lift of the valve was the same as the suction valve—viz., $\frac{1}{16}$ in.—and guards were fitted similar to those on the suction valves. The valve and seat were both of gunmetal, and the air discharge takes place into a similar space to that containing the suction valves, the arrangements for inspection, etc., being also similar. In the low-pressure air-cylinder the arrangement of valves was somewhat different, as they were fixed in the cylinder covers. The suction and discharge valves were the same as those in the high-pressure air-cylinder, with the exception that the barrel in the discharge valve was not quite so long. There were five suction and four discharge valves at each end of the cylinder; a passage 8 in. by 3 in. terminating in an 8 in. diameter opening forming the suction The delivery takes place into a similar passage cast on top of the cylinder, to which the intermediate receiver was connected. Besides being bolted down to the frame beds, the cylinders were stayed by means of 1½ in. diameter bolts, with turned cast-iron distance pieces to bracketed lugs cast on the cylinders. The water circulation through the various cylinders, covers, and receiver was provided for by a 1½ in. branch from the force-pump discharge (on the delivery side of the air-vessel), which divided at the compressor, one connexion being carried to the front cover of the high-pressure air-cylinder jacket, and back cover, and passing thence to the tank, the other being connected to the front cover of the low-pressure air-cylinder, the water circulating through the cover, cylinder jacket back cover, and the intermediate receiver. The total quantity of water used for cooling purposes amounted to about 500 gallons per hour. The engine speed was kept at 48 revolutions per minute by means of a Pickering governor. The steam-pipes were 4 in. diameter. The force pumps were of the ordinary horizontal non-rotative Blake-Knowles type, having cylinders 10 in., 16 in., and 25 in. diameter, and 18 in. stroke, the plunger being 14 in. diameter. The suction and delivery pipes were 12 in. and 10 in. diameter respectively, and the steam connexion was 3 in. diameter. The condensers were of the Wheeler Admiralty pattern, 28½ in. diameter, and 6 ft. 10 in. between the tube plates, and were supported on wrought-iron pipe columns to allow of the air-pump being placed underneath. The tubes, 433 to each condenser, and ¾ in. diameter, were of tinned copper, fixed into the tube plates with ferrules and cotton packing, and the whole of the water delivered by the force pump circulated through the condenser tubes so that no separate circulating pump was needed. The air-pump was of the non-rotative horizontal type, having steam-cylinder 6 in. diameter, air-cylinder 10 in. diameter, and both 12 in. stroke. When working under ordinary conditions, the water-level in the bore-hole averaged about 198 ft. below the centre of the discharge. The water, after being delivered by means of the compressed air into the tanks at the surface, was picked up by the force-pumps and delivered through about a mile of 15 in. main into the high-level tank, whence it flowed by gravitation into the town. Steam was supplied from three Lancashire boilers, each 30 ft. long by 7 ft. diameter, the main steam-pipe in the engine-room being fitted with a "Holder and Brook" steam-drier. The following particulars of the actual cost of working the plant for a period of seventeen months ending January 31, 1904, would be of interest: Cost of pumping from September 1, 1902, to January 31, 1904—oil waste, packing, and all other materials, 552*l* 14s. 8d; coal and slack (average cost, 10s. 10d. per ton), 1,636*l* 17s. 10d.; wages, 1,152*l* 16s. 5d.; total, 3,342*l* 8s. 11d. Water pumped, 317,128,000 gallons; total head, 350 ft.; cost per 1,000 gallons pumped, 2·52d.; cost per 1,000 gallons raised 100 ft. high, 0·72d.

In the discussion which followed, the general opinion expressed was that an air lift pumping system was not equal in efficiency or economy to high class pumping engines, and that its installation could only be justified where the special circumstances were unfavourable to an ordinary pumping plant.

Geology Structure of South-East Yorkshire.

Mr. Percy F. Kendall, Lecturer on Geology in the University of Leeds, read a paper on the "Geology Structure of South-East Yorkshire." He said the great county of Yorkshire was divided into three administrative areas—the Thriddings or thirdings of the early inhabitants, now modified into Ridings.

For the purposes of geological description the county might also be divided in tripartite fashion, though only one of the divisions coincided approximately with an administrative area. The geologist would draw a sinuous boundary line passing through Doncaster, Tadcaster, and Ripon to Darlington, which would mark the eastern edge of the Magnesian Limestone outcrop, and thus separate an area of Palæozoic rocks from one of Neozoic. The eastern region might then be transversely divided by the great low valley—the vale of Pickering—into, broadly, a Cleveland area and a Wold area from the two principal hill regions respectively included. The broad, low valley of the Ouse was excavated in the soft Triassic sandstones and marls,—but the extremely low relief was attributable not merely to the softness of the rocks, but to the covering of glacial and post-glacial deposits which mantle and almost obliterate the features of a more undulating surface of the solid rocks. The vale of Pickering was a faulted trough of Kimeridge clay; but here again the low relief was rendered still lower by a flat expanse of more modern accumulations in part of glacial and for the rest of post-glacial age. The Howardian Hills, which close in the vale of Pickering on the west, were formed by the outcrop of much faulted and shattered Lower and Middle Oolites, in which hard rocks, such as sandstones and limestones, predominate. The Wolds were formed by the outcrop of the chalk. Holderness was underlain by chalk worn down to a plain of marine denudation, but the surface was composed of glacial deposits disposed very largely in long mounds and ridges running in rough parallelism to the coast. The glacial deposits were of great interest and of much practical importance. To consider the case of Yorkshire: a great glacier at first emerged at the mouth of the Tees, but when its progress was obstructed by the great ice sheet it was deflected down the vale of York, receiving tributary glaciers from the valleys of the Swale and Ure, and left at its melting place a crescentic ridge of rubbish to form a rampart across the valley at Escrick, between York and Selby. At a later stage, when this ice was shrinking, it threw down another great ridge, upon which the city of York now stands. Along the Yorkshire coast, the great ice sheet filling the North Sea abutted and invaded the land to a distance roughly proportionate to the elevation and practicability of the country, where the ground was low and smooth, reaching a long way in, but making little progress where the seaboard was bold and lofty. Near Scarborough the ice advanced only three or four miles on to the land, but in the low vale of Pickering it intruded much further. In the Holderness region its effects were very striking and of immense importance. Before the glacial period there was no Holderness, but a great shallow bay with a smooth chalky floor, and bounded by chalk cliffs extending from the neighbourhood of Bridlington, by Driffield and Beverley, to Hessle, three or four miles west of Hull. The old cliffs buried behind and beneath the glacial deposits could be seen at the two extremities, and they could be traced by borings at many intermediate points. On the eastward side of these cliffs vast quantities of glacial clays, sands, and gravels were piled on the old sea bottom so as to add a large tract—Holderness—to the land surface, but the sea-floor of characteristic form and slope still existed. The ice sheet seems to have advanced far up the slopes of the Wolds, and its extension was everywhere characterised by the deposits and by the occurrence of stones alien to the district, whose distant homes could be placed with certainty in Sweden and Norway and the hilly regions of the north of England and the south of Scotland.

On the proposition of the President, a hearty vote of thanks was accorded to Professor Kendall.

THE ARCHITECTURAL ASSOCIATION SUMMER VISITS:

III.—PENSHURST.

No subject for research is fraught with keener interest than the evolution of domestic architecture in this country. Of the earlier houses now remaining, few have escaped the inevitable process of alteration; but Penshurst Place, which was visited on Saturday, the 18th inst., by the Architectural Association, stands to-day very much in the condition that the XIVth century builders left it, and is indeed the embodiment of all that reflects the life and character of an English domestic establishment of the middle ages. The subject is, perhaps, too well known to require anything beyond remarks of a general nature upon the present occasion.

The scale of the house is larger than in contemporary houses such as Haddon Hall, where the building was planned to suit the site; but at Penshurst the position does not appear to have presented restrictions in boundaries. Local stone is practically used throughout the earlier parts, where the walls have very pleasing texture and colour and it is instructive to observe the use of heavy relieving arches over the heads of traceried windows and other openings in a manner befitting the uncertain qualities of the material. Brickwork was employed in subsequent extensions in Tudor times, but a reversion to stone was made in the XVIIIth century, as seen by the classic features of the end windows of the Long Gallery. Rumour says that there is now a proposal to replace these insertions by windows of the original character; it is sincerely to be hoped that such is not the case.

The famous banqueting hall, with its large span timber roof and central fireplace, needs no description; we may, however, remind our readers of a delightful representation of its interior by Nash in his "Mansions."

The history of Penshurst is, in a sense, the history of England. The visits of various Kings and Queens are recorded in the walls as much as by documentary evidence. Ascending a beautiful stone-vaulted stair, a suite of state apartments is reached, of which the Ball Room, Long Gallery, and Queen Elizabeth's Drawing Room are the more important chambers. The latter room has the upper part of its walls covered with tapestry, arranged upon a basis of panelling. The framing consists of a rich dull green brocade; the borders, which correspond with mouldings, are ornately worked, whilst the panels contain geometric designs in which a sparing use of red is made; but the

general colouring is subdued, and the whole scheme is unique and at the same time entirely successful.

It is to be hoped that the lesson of this design in the application of textiles will be revived, in preference to the large scaled and confused figure compositions which have hitherto characterised tapestry decorations.

It is remarkable that the few discordant notes in the harmonious composition of this great house should have been struck in the XIXth century, where certain works of restoration have been attempted, and have resulted in signal failure. The situation is, however, saved to a large extent by the formal gardens, which were laid out about the same time—1871—by the late George Devey, and it is instructive to consider the rapidity with which the yew hedges and other growths have reached such luxurious dimensions. The principal garden, on the south front of the house, is devoted to flowers, arranged in four sunk plots laid out with yew borders in parterres. A large basin, with fountain, is placed at the intersection of the four main paths, and tall yew hedges with pediment shaped features enclose the garden on the south and east boundaries. Smaller gardens are arranged outside the latter, beyond which are kitchen gardens. The whole lay-out is a distinct success, wherein much of the spirit of the old craft is obtained; there are long alleys, grass walks, and quaint surprises, but the parallel setting of the main lines which is emphasised by the yew hedges is perhaps monotonous.

The remainder of the visit was spent in hurriedly viewing the church and also some charming Kentish domestic work in the village.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Mr. Cornwall, Vice-chairman, presiding.

School Buildings and Contracts.—Alderman Dew asked the Chairman of the Education Committee if the Council's 20-mile radius could be included in the form of contract for school building work in place of the 12-mile radius of the late School Board.

Sir W. Collins said that apart from the radius the School Board form of contract contained provisions similar to those in the Council's form. He would answer the question in the affirmative, provided that such alteration did not interfere with works in progress.

The Education Committee recommended and it was agreed that, until the first meeting of the Council after the summer recess, contracts for work of an urgent character, not including new schools, or work on new schools (unless required to complete new schools nearing completion), be entered into on the forms of contract and specification used by the late School Board for London; that the work be carried out under the direction of Mr. T. J. Bailey; and that the Education Committee be empowered to invite tenders for the execution of such work from the selected list of contractors of the late School Board.

The following recommendations were also agreed to:

That the Board of Education be informed that the Council is of opinion that it is desirable that the scheme of alterations and improvements proposed to be carried out at the High-street school, Stoke Newington, for which tenders were received by the late School Board, should be proceeded with. [Messrs. J. Chessum and Sons: 5,133*l.*]

That the Board of Education be informed that the Council is of opinion that the proposed improvements at the Shap-street School, Kingsland-road, for which tenders were received by the late School Board, should be proceeded with. [Messrs. J. Chessum and Sons: 11,651*l.*]

That the clerk of the Council be authorised to sign, on behalf of the Council, the contract with Mr. E. Triggs, as drawn up by the officials of the late School Board, for carrying out a scheme of improvements at the Buckingham-terrace School, North Kensington, the tender for which amounts to 5,067*l.*

Proposed Woolwich Tunnel.—The Bridges Committee recommended that the Council should seek parliamentary powers in next session for the construction of a footway tunnel, similar to the Greenwich tunnel, to connect North and South Woolwich under the Thames. The cost of construction was estimated at 145,000*l.*, and the annual cost of maintenance at 2,500*l.*

Lord Welby, on behalf of the Finance Committee, moved, as an amendment, that the matter be referred back, on the ground that the capital commitments of the Council rendered it inexpedient to proceed with the work until the completion of Rotherhithe Tunnel and Vauxhall Bridge.

After a long discussion the Council divided: For the amendment, 71; against, 41.

The recommendation was accordingly referred back.

Victory Bridge, Ben Jonson-road.—The same Committee recommended and it was agreed after discussion, that, subject to a contribution by the Council of the Metropolitan Borough of Stepney of one-fourth of the net cost of the improvement, such contribution not to exceed 4,250*l.*, powers be sought in the session of 1905 to enable the Council to reconstruct Victory-bridge, Ben Jonson-road, in general accordance with the plan "B" presented to the Bridges Committee on 22nd July, 1903.

Ventilation of Committee Rooms.—On the recommendation of the Establishment Committee it was agreed that expenditure not exceeding 645*l.* be authorised for the purpose of providing ventilation for the committee rooms, etc., at the county hall, being 300*l.* for providing and fixing the fans, wiring, and fittings, 300*l.* for tubes, ducts, and other fittings, cutting away walls, etc., and 45*l.* in connexion with the ventilation of the members' lavatory and tea-making room; and that the work of cutting away walls, floors, ceilings, etc., be referred to the Works Committee to carry out as a jobbing work.

The Valuation Bill.—The Parliamentary Committee reported upon the Valuation Bill, and recommended:—"(*a*) That the principle of the Valuation Bill, 1904, be approved. (*b*) That, in the opinion of the Council, the constitution, powers, and duties of assessment committees should remain as at present, with the following alterations—i., That the London County Council should, as proposed by the Bill, be the valuation authority for the County of London, with power to make by-laws for securing uniformity of practice in valuation; ii., that the assessment committees should be appointed by the metropolitan borough councils in every instance; iii., that the assessment of all property belonging to local authorities (except that of the London County Council and of railway, gas, water, and similar undertakings) should be transferred to a central assessment committee appointed by the London County Council, such committee to have the same powers, rights, and duties as other assessment committees, in relation to matters with which it is concerned; iv., that, in the opinion of the Council, all questions relating to the rating of Government property should be referred to the central assessment committee appointed by the London County Council. (*c*) That, in the opinion of the Council, it should be empowered to send an officer to sit with each local assessment committee, with functions analogous to those of surveyors of taxes, but not limited to gross value. (*d*) That, in the opinion of the Council, machinery, similar to that of the County Rates Act, 1852, should be provided in the Bill for the purpose of the proper co-ordination of totals. (*e*) That the Parliamentary Committee be instructed to endeavour to secure such amendments in the Valuation Bill, 1904, as will give effect to the before-mentioned proposals."

This was adopted, and the Council soon after adjourned.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Brixton.—That the resolution of April 26, consenting to the erection of a one-story office building at No. 175, Ferndale-road, Brixton, in accordance with the plan submitted with the application of Mr. W. H. Duffield, on behalf of Mr. D. Greig, be rescinded.—Agreed.

Rotherhithe.—That the resolution of March 15, consenting to the erection of an iron shed on the north side of Rotherhithe-street, Rotherhithe, in accordance with the plan submitted with the application of Messrs. Croggon and Co., on behalf of Messrs. Quirk, Barton, and Co., be rescinded.—Agreed.

Lewisham.—Wooden overhanging eaves, barge boards, and pents to five houses on the north side of Ewkhurst-street, Lewisham, between Crofton-park-road and Salehurst-road (Messrs. J. G. Nicolls and Son).—Consent.

St. Pancras, South.—A one-story shop upon part of the forecourt of No. 334, Gray's-inn-road, St. Pancras (Messrs. Willis and Leslie for the Rev. A. Baker).—Consent.

Norwood.—Additions in front of Nos. 9, 10 and 11, Benton's-lane, Gipsy-road, Norwood (Mr. J. Redwood).—Consent.

Westminster.—Stone columns, under existing stone balconies, in front of "Albert-court," Prince Consort-road, Westminster (Mr. R. J. Worley for Mr. W. H. Dunn).—Consent.

St. George, Hanover-square.—Permission to retain a glass show-case at No. 84B, Piccadilly, abutting upon Clarges-street, St. George, Hanover-square (Messrs. Rohan and Co.).—Refused.

Lewisham.—Buildings on the east side of Bromley-road and south side of Sangley-lane, Catford (Mr. A. W. Osborn for Mr. J. Watt).—Refused.

Wandsworth.—Houses on a site abutting upon the southern side of Coverton-road, Tooting, and western side of Condy-road (Mr. W. C. Poole for Mr. H. Keen).—Refused.

Width of Way.

Woolwich.†—The erection of Nos. 21 and 23, Pound-place, Eltham, with the forecourt fences at less than the prescribed distance from the centre of the roadway of the street (Mr. G. Rathbone).—Consent.

Width of Way and Line of Frontage.

Hampstead.—Buildings with shops upon the forecourts of Nos. 319, 321, and 323, West-end-lane, Hampstead (Messrs. T. H. and A. M. Watson for Mr. J. Phillips).—Refused.

Formation of Streets.

Hampstead.—That an order be issued to Messrs. Farebrother, Ellis, and Co., refusing to sanction the formation or laying out of a new street for carriage traffic, to lead from Redington-road to Bracknell-gardens, Hampstead (for Sir Spencer P. M. Maryon-Wilson, Bart.).—Agreed.

Formation of Streets and Width of Way.

Bermondsey.—That an order be issued to Mr. T. J. Bailey sanctioning the formation or laying out of a new street, for foot traffic only, to lead from the north-eastern end of Westcott-street to Pardoner-street, Southwark, and the erection of boundary walls on the north side of Westcott-street and south side of Pardoner-street, Southwark (for the Education Committee of the Council).—Agreed.

Space at Rear.

St. George, Hanover-square.—A modification of the provisions of section 41, with regard to open spaces about buildings, so far as relates to the proposed erection of shops and residential flats on a site abutting upon Buckingham-palace-road, Eccleston-street and Eccleston-street East, St. George, Hanover-square (Messrs. Read and MacDonald for Messrs. Holloway Brothers).—Consent.

Holborn.—A modification of the provisions of section 41, with regard to open spaces about buildings, so far as relates to the proposed erection of buildings (block "B") upon a site abutting upon Vine-street and the eastern side of Shaftesbury-avenue, Holborn, with irregular open spaces at the rear (Mr. R. J. Worley for the Shaftesbury-avenue Freehold Land Syndicate).—Consent.

Buildings for the Supply of Electricity.

Strand.—A deviation from the plans approved for the conversion of a generating station at Maiden-lane, Strand, into a distributing station so far as relates to an alteration in the form and construction of the roof (Mr. W. B. Pinhey for the Charing Cross and Strand Electricity Supply Corporation, Ltd).—Consent.

Deviation from Certified Plans.

Whitechapel.—Certain deviations from the plans certified by the district surveyor under sections 13 and 43 of the Act so far as relates to the proposed rebuilding of the "Ben Jonson" public-house, No. 22, Goodman's-yard, Minories, Whitechapel (Mr. J. P. Choate for Mr. J. Webster).—Consent.

Dwelling-houses on Low-lying Land.

Peckham.—That a licence be granted under sections 122 of the Act, to Mr. W. Barbut for the erection of two houses on low-lying land, situated at Peckham-park, S.E. (Mr. E. Crosse on his behalf).—Consent.

The recommendation marked † is contrary to the views of the local authority.

ARCHITECTURAL SOCIETIES.

SHEFFIELD ARCHITECTS AND SURVEYORS.—Upwards of fifty members of the Sheffield Society of Architects and Surveyors visited Roche Abbey on Saturday last. The ruins of the abbey and the site of the ancient monastery formed the subject of an interesting description given by Mr. J. R. Wigfull. Luncheon was served in the abbey grounds, the party afterwards driving to Laughton-en-le-Morthen, where the vicar (Rev. Thomas Rigby) gave to the visitors a short history of the church, and also described its principal architectural features. The reverend gentleman also showed them the site of the Saxon earthworks, or encampment. Tea was served in the schoolroom by the kindness of the vicar, who was accorded a hearty vote of thanks, on the proposition of Mr. T. Winder, President of the Society, seconded by Councillor W. C. Fenton, Hon. Secretary.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The concluding meeting of the session was held at the rooms in Sackville-street, on the 15th inst., Mr. C. H. Compton, V.P., in the chair. The Rev. Dr. Astley exhibited a curious volume of sermons which were preached at East Rudham during the period of the Commonwealth, entitled "Præterita, a summary of sermons by John Ramsay, minister of East Rudham, printed by Thos. Creake, for William Reade, at his house over against ye Bear Tavern in Fleet-street, 1660." Mr. Kershaw said the dedication of the first sermon in the volume to Mr. James Duport offers interesting data as to the family of Duport who had settled in East Anglia, as refugees from France. The name Duport has also been connected with Caius College, Cambridge. The sermons preached in Norfolk would naturally lend themselves in dedication to one of a noted local family. Mr. Patrick, Hon. Secretary, exhibited, on behalf of Mr. Winder of Sheffield, a curious earthenware water pipe, about 12 in. in length and 4 in. in diameter externally. Each pipe at one end is shouldered to form a neck 3 in. in diameter for insertion into the next pipe, where they were joined by a very hard cement. The pipes are of a rich brown glaze outside, very like Brampton ware, but, where fractured, the section shows a close-grained bluish earthenware. At the thick end of some of them there is a narrow band, sunk, about $\frac{3}{16}$ in. wide and half that in depth, having raised dots about 6 to the inch in the circumferences. About 3 in. from the neck the pipe is rough, of the rest of the length to the band, the surface is quite smooth. A broken pipe shows the interior to have corrugations more or less spiral, like the thread of a screw, the corrugations being about $\frac{3}{4}$ in. from ridge to ridge. Some 20 or 30 of these pipes were dug out of an old cart-track 7 to 8 ft. below the general level of the ground, the pipes themselves being from 2 to 3 ft. below the track level, in Canklow Wood, near Rotherham. The site is within a mile of Templeborough Roman camp, but, whether they had any relation to the camp or are of Roman or mediæval design, there is no evidence to show. A paper was read by Rev. Dr. H. J. D. Astley upon a subject which, at first sight of the title, would seem to have but little relation to archæology, viz., "Was Primitive Man Ambidexterous?" but in the sense in which he employed the term the paper was instructive and interesting. He deduced from the many implements discovered in Kent and in France and elsewhere belonging to the so-called Eolithic, but which he preferred to call the "Proto-Palæolithic Age," adapted for use by the left hand and almost as numerous as those for use by the right hand, that from the earliest period man was an ambidexterous being. As we descend the stream of time to the dawn of history we find man continuing to use both hands impartially. Palæolithic man in his artistic representations of animals, birds, etc., drawn on rock and pieces of bone with equal facility from both left and right, must have been ambidexterous, although in warfare he had begun to use his right hand for offence and reserve the left for purposes of defence. The Neolithic Age affords evidence in the pounders, borers, knives, scrapers, and hammers, that for purposes of domestic life man still used both hands indifferently. In the Bronze Age all weapons were hafted, so there is no actual evidence forthcoming as to the use of the left hand, but, that the right hand had not yet finally obtained the victory might be deduced from the fact that the Semites, Greeks, and Romans, at least apparently, wrote first by preference with the left hand, and that the early Greeks and Romans wrote impartially with both. It was not until well within the historic period that the right hand finally achieved the predominance it has held to the present day. Mr. Cheney, Mr. MacMichael, the Chairman, and others took part in the discussion which followed the paper.

ENGINEERING SOCIETIES.

THE JUNIOR INSTITUTION OF ENGINEERS.—On Tuesday evening, June 14, a visit of this Institution took place to the Motor-car Works of Messrs. D. Napier and Sons, Acton Vale. The attendance was exceptionally numerous, upwards of 120 being present. Under the guidance of Mr. R. B. A. Ellis (member of the Institution) and others of the staff, the party, divided into groups, were shown over. Special attention was devoted to the testing-room, where several engines were shown under process of testing. The works consist principally of one large building on the ground level, 282 ft. by 124 ft., more than half of which is used as a machine shop, and the remainder for an erecting shop, where the cars reach their final stage before being tested. The central portion of this building is used as a store. The other smaller shops consist of a foundry, smithy, motor-testing house, pattern makers' shop, etc., arranged in separate buildings. Motors are made in several types, from the 15-h.p. four-cylinder to the 100-h.p. racer, besides marine motors in several sizes. A new type of motor has recently been introduced with six cylinders, cast in three parts and mounted on an aluminium crank-case. All work is finished to gauge. Motive power is obtained from an 80-h.p. Westinghouse three-cylinder gas engine and a two-cylinder engine of the same make. The next visits of the Institution will take place on Saturday, the 25th inst. (to-day), when the Chelsea Generating Station of the Underground Electric Railway and the L.C.C. Pumping Station in Lots-road are to be seen; and on Saturday, July 9, an excursion is to be made to Dover. The new turbine steamer *The Queen*, the Admiralty Harbour Works, and the works of the Dover Harbour Board are included in the programme, and in the afternoon the Mayor and Mayoress of Dover will receive the Institution at the Town Hall.

PLENUM VENTILATION AND THE ROYAL VICTORIA HOSPITAL, BELFAST.

THE following is the joint reply by Mr. Wm. Henman and Mr. Thos. Cooper, architects, and Messrs. Henry Lea and Son, consulting engineers, to the criticisms on the plenum ventilation and the Royal Victoria Hospital, Belfast, at the recent meeting of the Royal Institute of British Architects, as reported in our issue of the 11th inst.

"In consequence of the late hour at which this discussion was taken on the 6th inst., it was impossible for us then to reply; but, with the sanction and approval of the President, we now do so as briefly as the importance of the subject will allow. We welcome such minute inspection as that made by Mr. Pick, because, when undertaken with an open mind, it is likely to extend appreciation of the possibilities of plenum ventilation for hospital purposes. We put forward no claim to having arrived at perfection in plan, and are not surprised that so novel an arrangement of wards calls forth criticism, notwithstanding that those who have had to serve in or occupy the hospital are perfectly content with the facilities for administration, and its comfort and cheerfulness.

The exceptional conditions demanded special treatment as regards drainage. All drains are kept well below the floor level of the air ducts, which are by no means the dark, damp places some seem to suppose. The City Building Surveyor of Belfast took a broad view of the subject and advised we should have a free hand with the drainage. The object aimed at was to convey from the buildings, as quickly as possible, all foul matter and waste waters, and so prevent the generating of offensive gases on the site. The multiplication of traps, manholes, and gullies was advisedly avoided; the drains run in long straight lines, they are thoroughly ventilated, and there is ample flush for cleansing them. Soil drains are distinct from wastes.

On inquiry, we find that a few of the calked lead joints to vertical waste pipes have slightly given, and we are obliged to Mr. Pick for detecting that fault, because means will now be taken to obviate it in future; but we venture to say that no harm would in this case result, as the pipes are of thick metal, in short lengths, easily got at, and quite away from any opening into the hospital; such pipes are safer and can be more readily inspected and joints made good, if necessary, than as usually provided for hospitals, viz., in long lengths of thin metal, with many inaccessible joints, and others in quite close proximity to windows.

Mr. Pick's sentimental objection to washing-up sinks in sanitary turrets is not only applicable to this hospital; the arrangement, however, is found to be convenient in practice and is not complained of by the nursing staff. If there were difficulty in keeping milk fresh, as things are in this hospital, his criticism would be reasonable; but this, together with his wish for open windows, evidently proves that Mr. Pick has not yet fully grasped the possibilities and requirements of plenum ventilation.

Successful application of the system implies that continuously, year in and year out, sufficient change of air shall be secured throughout the building. Where, then, is the necessity for open windows by which air can only be admitted proportionately to the force of wind outside or to difference of temperature within and without? Mr. Pick was hypercritical in his remarks on the details of engineering. Although there are no outer doors to the stoke hole, he may not have noticed that only the fronts of the boilers are exposed, the wall above being entirely built up, access to the space above the boilers being from the pump-house—a much more cleanly arrangement than having the tops of the boilers open to the stoke hole.

At this time of year, when no heating of the building is required, the feed-water for the boilers would be nearly cold, because little or no condense water is going back to the hot-well, and all the exhaust steam from the engines is usefully engaged in providing the hot-water supply throughout the hospital. There must be a receptacle of some kind for the condense water flowing back from the various steam traps. Whether or not this receptacle takes the exact form of the hot-well that we have provided seems to us to be immaterial.

With regard to the exhaust steam from the engines going to waste, this is not the case. The exhaust from the fan engine is used for the hot-water supply to the hospital, and the exhaust from the laundry engine is used for heating the water for the laundry, and the surplus from the calorifier goes to heat the coils in the drying-room.

Mr. Pick thinks that there are too many steam traps, but if he were to go carefully into the matter, he would find that the number could not with advantage be reduced. The question of generating electricity on the site was duly considered and abandoned in consequence of the greater cost and less efficiency than the arrangement adopted.

Mr. Saxon Snell's remarks can scarcely be taken seriously, and were evidently justly appraised by subsequent speakers. In contrast therewith, we commend the more thoughtful views expressed by Dr. S. Rideal and the Rev. J. B. Lock, because, with greater practical experience, their opinions may become more definite and serviceable.

Mr. Harold Griffiths questioned the employment of fixed screens of cocoa-nut fibre, but the experience of ten years confirms us in their use. If of ample area, periodically cleansed and renewed, they are suitable and efficient, and far more simple and serviceable than when made to revolve, because then they either become over-saturated with water or imperfectly cleansed.

When made in sections, as at Belfast, cleansing and renewal are easily effected at much less cost than can be done with revolving screens, to say nothing of the additional cost incurred by causing them to continuously revolve. Heating coils should certainly be kept clean; we always arrange so that they can be, and are regularly cleansed as well as the air ducts.

When open fires are employed chimneys have to be swept, grates cleaned, and works of repair and renewal from time to time effected, which probably involve greater labour and expense than is required for cleansing and maintaining suitable appliances for securing plenum ventilation with heating.

Mr. Max Clarke errs in advocating air chan-

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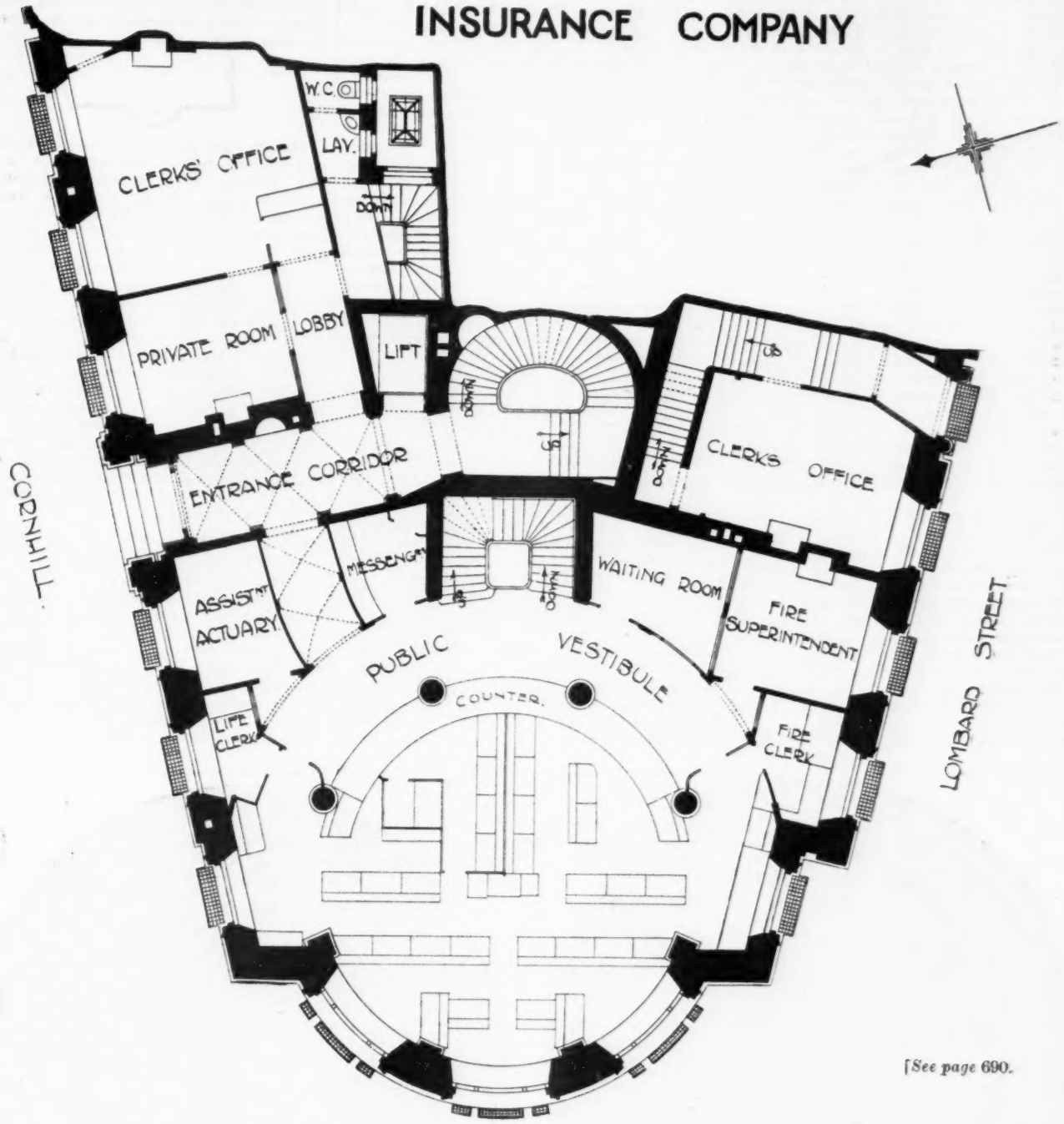


[See page 690.

PLAN OF THE GROUND FLOOR

SCALE OF 10 5 0 10 20 30 40 50 FEET.

nels of metal or lined with glass or vitreous enamel; such materials are costly, and in many respects unsuitable. Good plain brickwork in ducts of ample proportion, is economical and thoroughly serviceable.

It is surprising that Mr. A. E. Munby has not come across buildings in which the furnace to the heating apparatus is used for extracting some of the air from the interior of the building. It may be better than trusting altogether to chance; but, if he wishes to realise the value of the arrangement, we suggest he should calculate the cubical capacity of a building—say, a church—and ascertain the volume of air passing through the furnace flue in a given time; he may be surprised to find how long it takes to cause a single change of air in the church. He may also take into consideration the fact that probably for six months in the year there will be no fire in the furnace, just when change of air within the building is most required.

If those who question whether advocates of plenum ventilation pin their faith on the admission of air to the upper portion of an apartment and its exit near the floor level carefully read Mr. Henman's paper, they will scarcely fail to understand why that arrangement accords with nature's method, and is, therefore, preferably followed.

It is difficult to understand why the speakers who advocated plenum ventilation for assembly-rooms, schools, and even for operating rooms, question its utility in hospital wards; because, even in hospitals erected on the most approved pavilion plan, complaints of defective ventilation are common, particularly at night and in the early morning. Unfortunately, hospitals are rarely visited by architects or the public at such times. But go to the General Hospital, Birmingham, or the Royal Victoria Hospital, Belfast, at any hour of night or day or any day of the year, and it will be found that uniform temperature and freshness are maintained, to say nothing of freedom from draughts and of the noise, dirt, irregular heating, and attention required when open fireplaces are employed.

Expense, as the President intimated, is certainly an important item in connection with any system of ventilation and heating. Our endeavour has been so to simplify hospital planning, and adapt appliances for heating and ventilation, that at Belfast the initial outlay and cost for maintenance are very considerably below those of any other similarly complete hospital.

The deductions of Mr. Geo. H. Bibby [published in the *Institute Journal*] are so obviously unreliable that it is not necessary to take up time to do more than state that we communicated them to the superintendent of the hospital, and here give his reply, viz.:—

'The general health of the hospital establishment is excellent (*twice underlined*). I cannot trace the doctor who is alleged to have said the hospital always gives him headache. I have twelve doctors and medical pupils in residence, and all, except one, are in excellent health, and the hospital had nothing to do with that one man's state of health.

'The nurses, too, are in far better health than they were before we came here. I have that from the doctor who attends them.

'Why don't you propose to the R.I.B.A. to send a small deputation here to inquire

into the whole question on the spot? What all should desire to know is the truth—whether plenum ventilation is a success, and worthy of adoption, or not; and, in no other institution can that be better ascertained than here, where a very fair idea can also be obtained of the cost, which is a matter of great importance.'

He has also given us full particulars *re* the amount of coal consumed, and the number of residents in the old and new hospitals, which entirely disprove Mr. Bibby's statements. For the year 1902 it was 516 tons for 190 residents in the old building, where the heating and hot water supply were very idadequate, and only the linen from small fever wards was washed on the premises.

In the new buildings the heating, ventilation, and hot water supply are ample for the full complement of about 400 residents, although at present there are only 300. There is also a complete laundry, in which all the washing is done on the premises; on the basis of eight months' coal consumption, it is estimated that it will not exceed 1,800 tons for the year—by no means a proportionately unreasonable amount for the effective work accomplished in an establishment so much larger than the old one. We hope that Mr. Bibby may be more accurate in the information he is collecting for publication *re* the heating and ventilation of hospital wards, or it will be of no practical value.

In conclusion, we do not expect our work to be above criticism. Diversity of opinion there is sure to be. Most of us have probably learnt that what we once thought impossible, or at least unlikely, has actually come to pass, and that appliances and processes have become practically useful, and a commercial success, in consequence of slight improvements in parts. If, therefore, plenum ventilation be accepted in principle, its public utility really depends on the careful adjustment of details and of full knowledge of the best methods for securing desired results.

Every installation, no matter how badly proportioned, in which air is forced through a building, is called 'Plenum Ventilation,' but air at a high temperature forced along small ducts and through buildings by high speed fans, cannot, as regards efficiency, be compared with the low temperature, spacious ducts, and slow speed fans adopted at Belfast. Bad examples have brought condemnation upon the plenum system, generally by those who do not discriminate between the various means by which it can be carried out. On what may be termed the 'high pressure method,' a temperature of 130° F., as the air enters the apartments, is not uncommon; but in Belfast the temperature of the air in no portion of the building exceeds 62° or 63°. Before designing the machinery for Belfast, inquiry was made as to the power which would be required for working on the high pressure method, and it was found that 100 horse-power would be necessary; instead of which, it is successfully accomplished with an ascertained expenditure of 5½ horse-power, on what may be termed the 'low pressure method.'"

Illustrations.

PORTRAIT OF M. CHOISY.

WE have pleasure in presenting our readers with a portrait of M. Auguste Choisy, the distinguished French *savant* to whom the Gold Medal of the Institute was presented on Monday last, as fully described on another page.

We have to thank M. Choisy for his courtesy in sending us a photograph for the purpose.

THE LIVERPOOL AND LONDON AND GLOBE INSURANCE CO., CORNHILL.

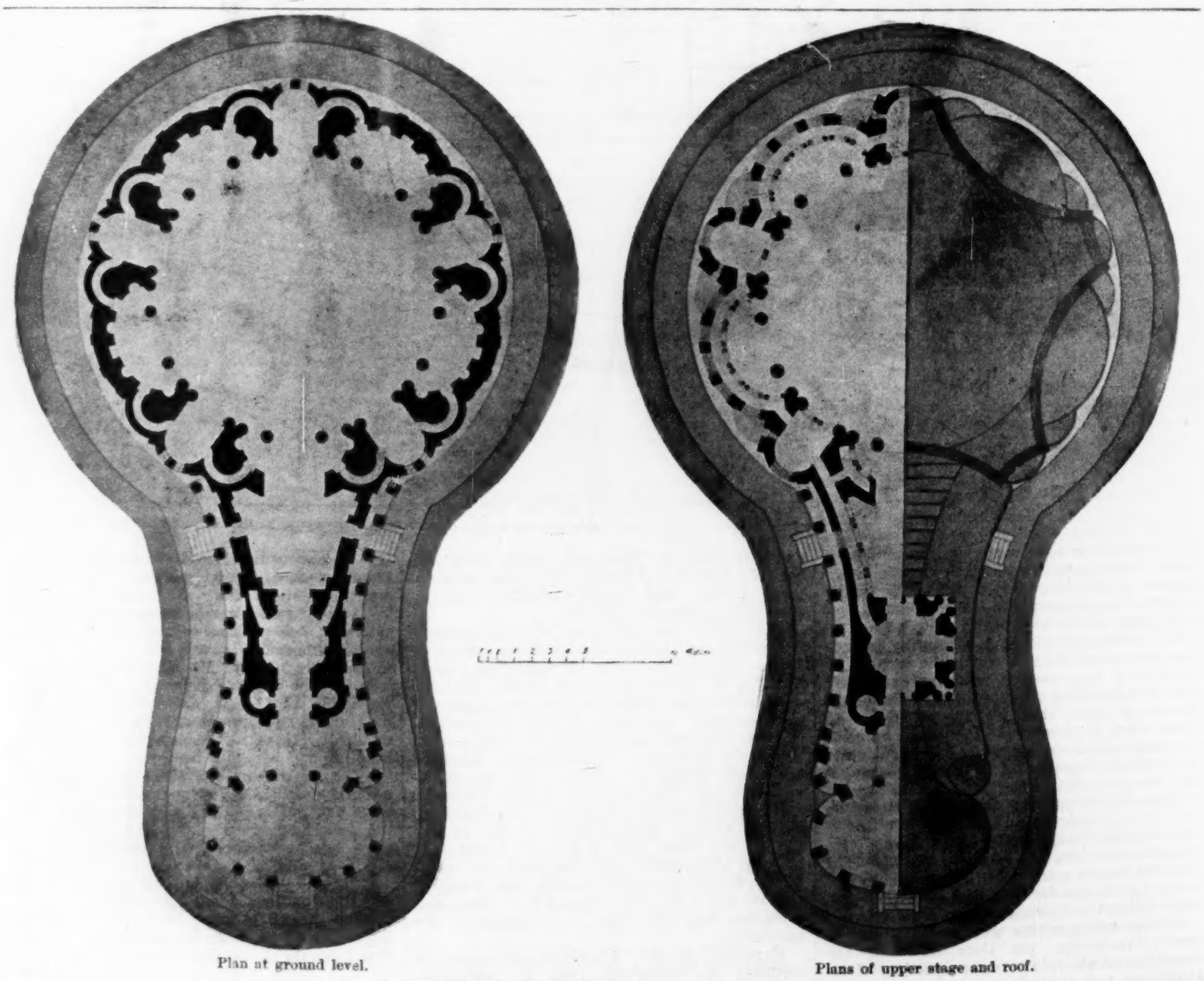
THE site of this building is no doubt one of exceptional importance, but it is none the less one which, on account of its outline, it is exceptionally difficult to treat. This difficulty has been to a considerable extent modified by an alteration suggested to and accepted by the City authorities, by virtue of which the angles at Cornhill and Lombard-street are now identical, instead of being as formerly the one acute and the other obtuse, thus

The plan (see p. 689) has been controlled by and adapted to the peculiarities of the site. The circular front between Cornhill and Lombard-street, which has been retained, has to a large extent dominated the design both externally and internally. On the ground floor, for instance, the general office of the company is planned as a circle, with a gallery on the Mezzanine floor supported by the columns, while externally the circular treatment is continued upwards, and is terminated by a dome forming a prominent central feature opposite to the axis line of Cheapside. The building is executed externally in Portland stone, and the whole of the office of the company internally, as well as the entrance corridor, is finished in marble, including columns, wall linings, cornices, balustrades, and floors, the ceilings of the office being in faience. The general contractors are Messrs. Colls and Sons.

J. MACVICAR ANDERSON.

THE ANCIENT CHURCH OF ASFELD, ARDENNES (FRANCE).

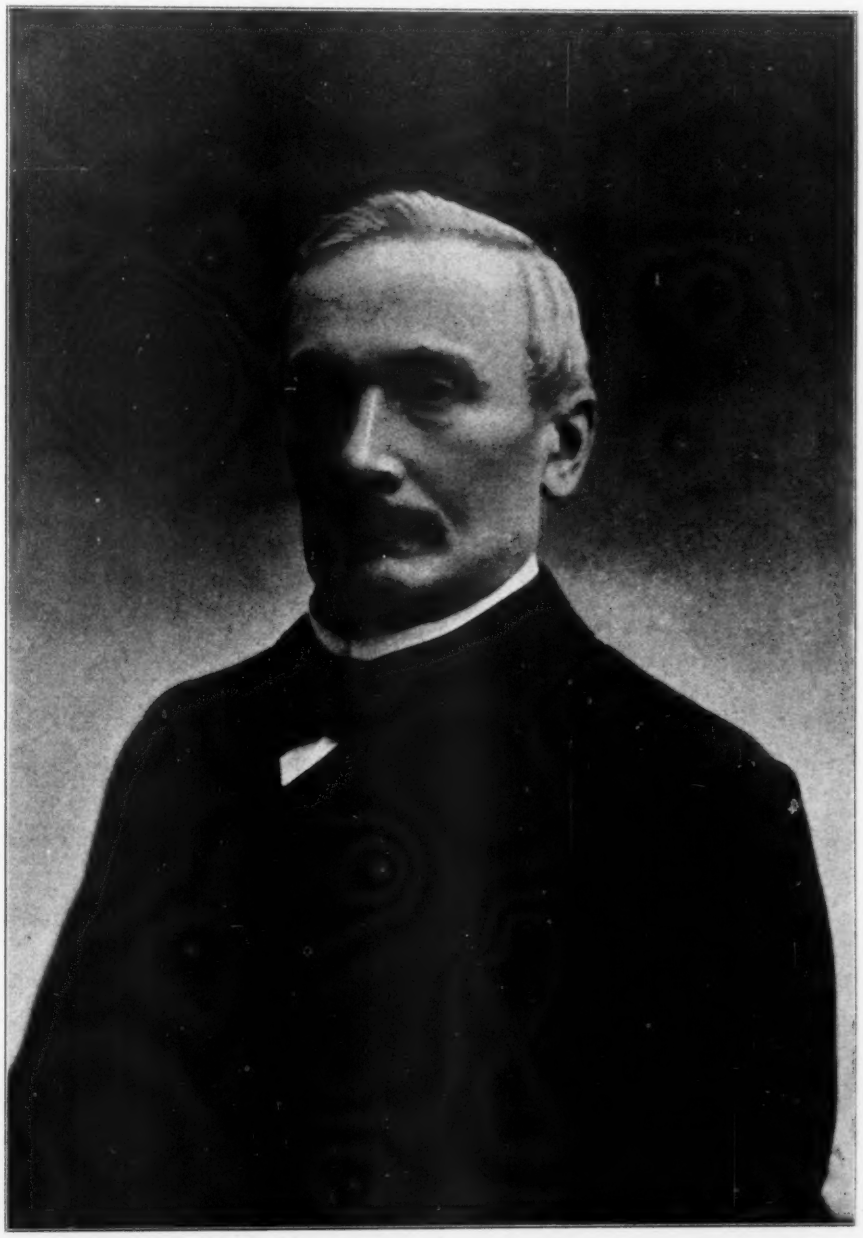
THESE illustrations, with the plans, are from a set of drawings exhibited in the architectural room at the Paris Salon, 1903, by a well-known French architect, M. Allard. We at first supposed that this was a modern church built from his designs, but on inquiry found that the drawings were only illustrative, and that the church was an old one; but we were not able to get any precise information either as to its date or whether there was any record of the



Plan at ground level.

Plans of upper stage and roof.

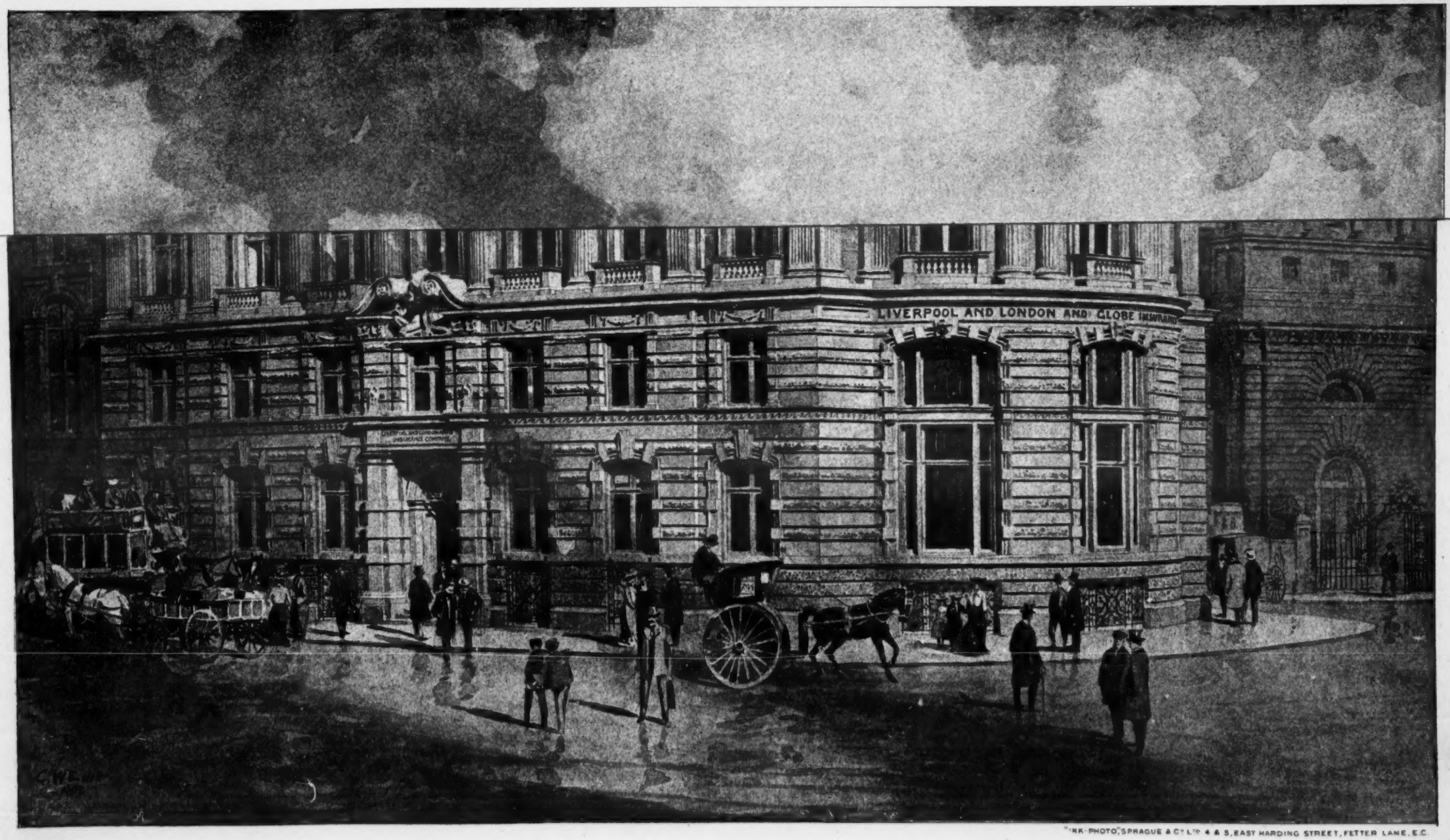
Ancient Church of Asfeld, Ardennes, France. Plans.



M. Auguste Choisy.

INGÉNIEUR-EN-CHEF, SERVICE DES
PONTS ET CHAUSSÉES, FRANCE.

ROYAL GOLD MEDALLIST, INSTITUTE OF ARCHITECTS, 1904.



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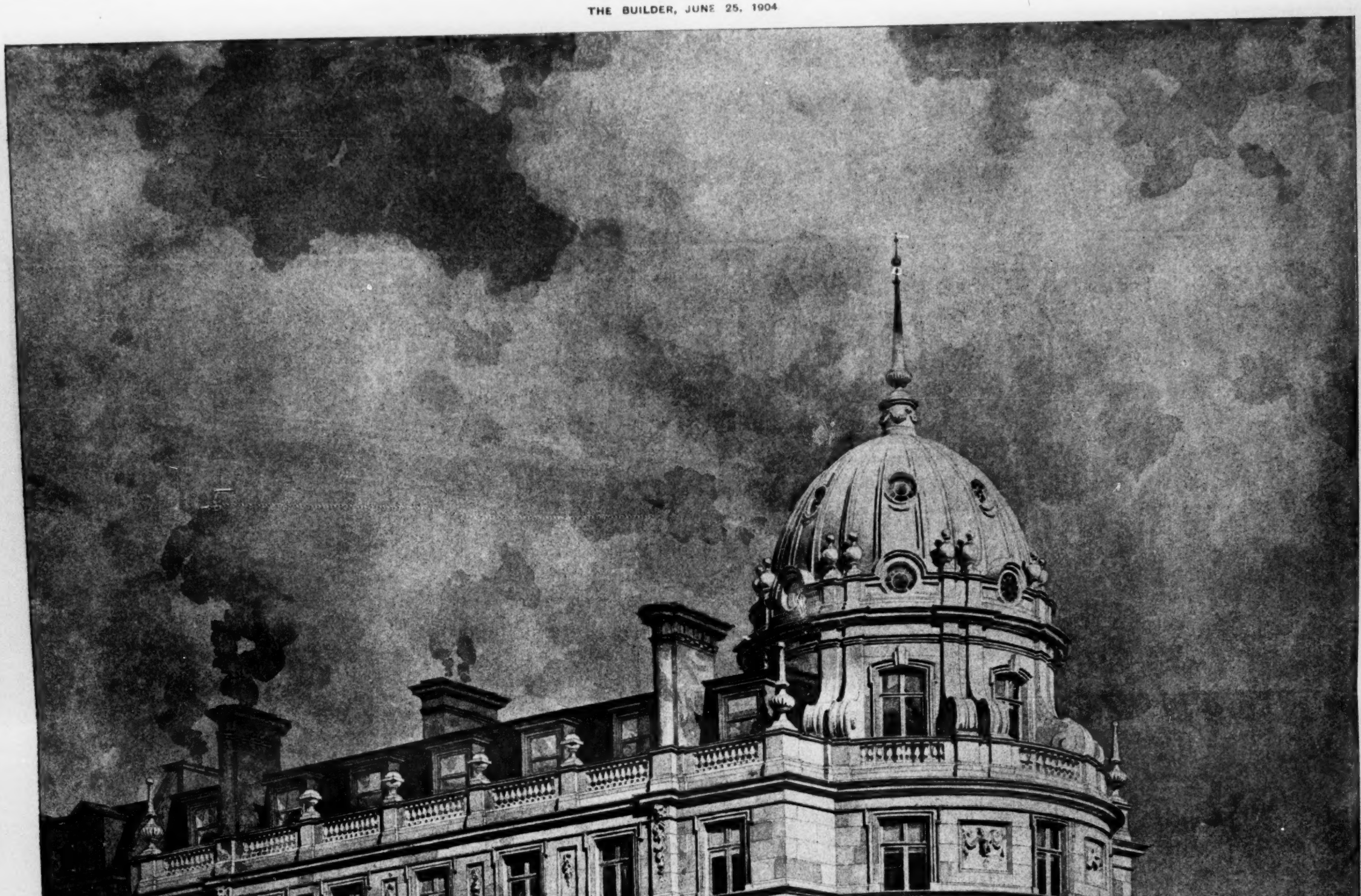

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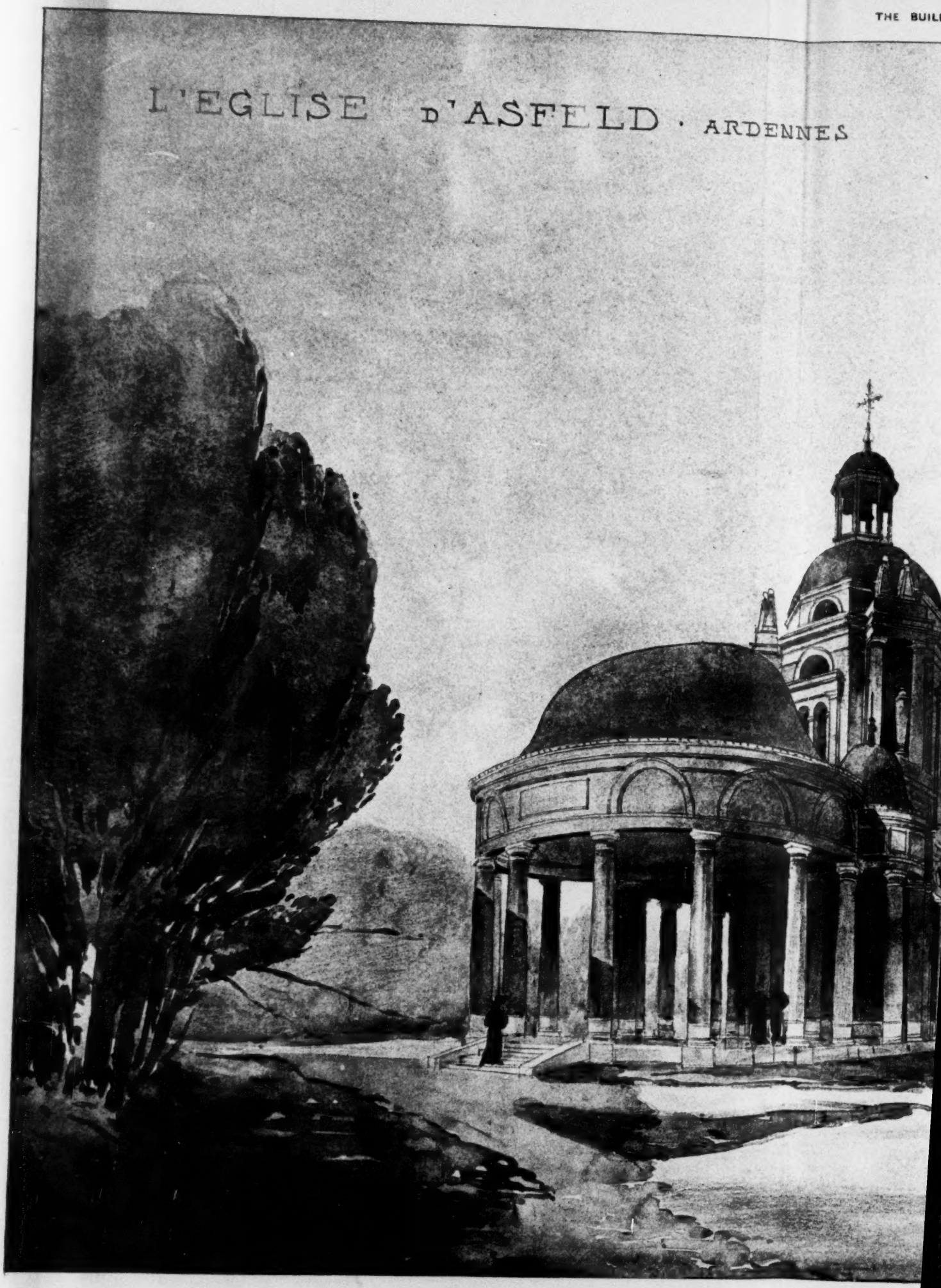
L'EGLISE D'ASFELD · ARDENNES



THE ANCIENT CHURCH OF

FROM A DRAWING BY M. J. E. ALLARD

PERSPEC

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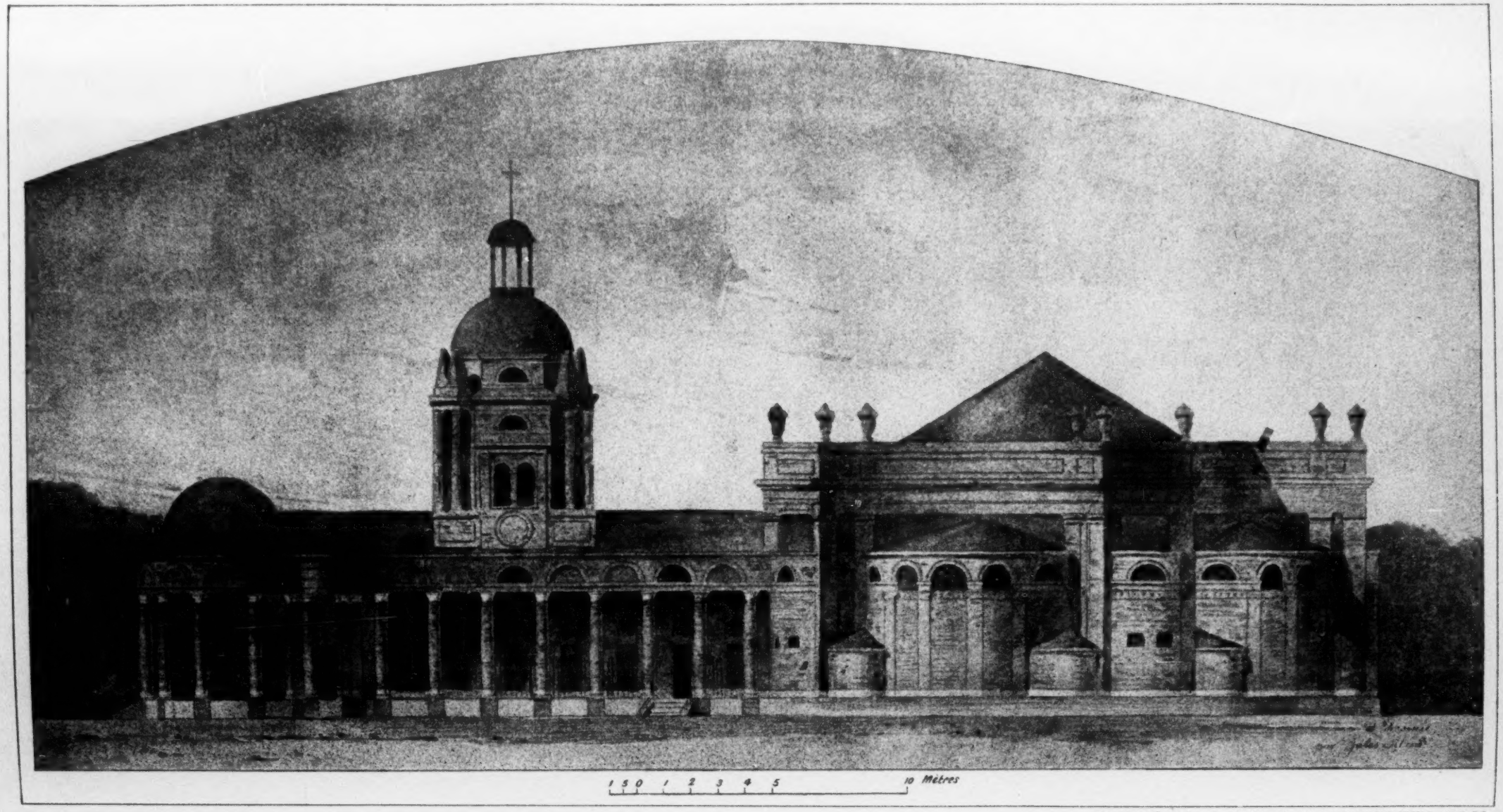
URCH OF ASFELD, ARDENNES, FRANCE.

E. ALLARD, EXHIBITED AT THE PARIS SALON, 1903.

PERSPECTIVE VIEW.



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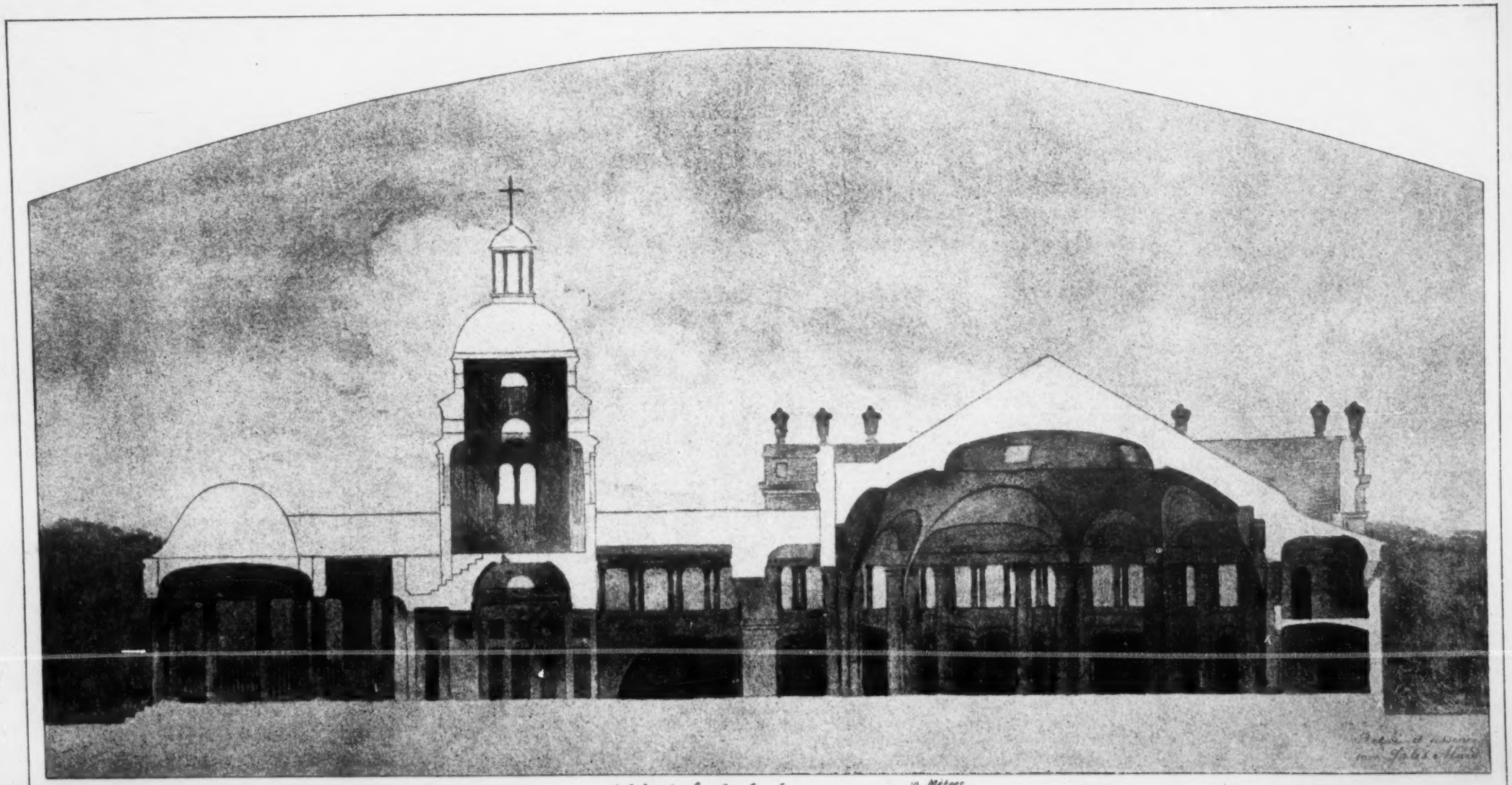
THE ANCIENT CHURCH OF ASFELD, ARDENNES, FRANCE.

FROM A DRAWING BY M. J. E. ALLARD, EXHIBITED AT THE PARIS SALON, 1903.

SIDE ELEVATION.



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THE ANCIENT CHURCH OF ASFELD, ARDENNES, FRANCE.

FROM A DRAWING BY M. J. E. ALLARD, EXHIBITED AT THE PARIS SALON, 1903.

LONGITUDINAL SECTION.

DALSTON HALL CUMBERLAND FOR E W STEAD ESQ VIEW FROM H W

J·W BENWELL·ARCHT·

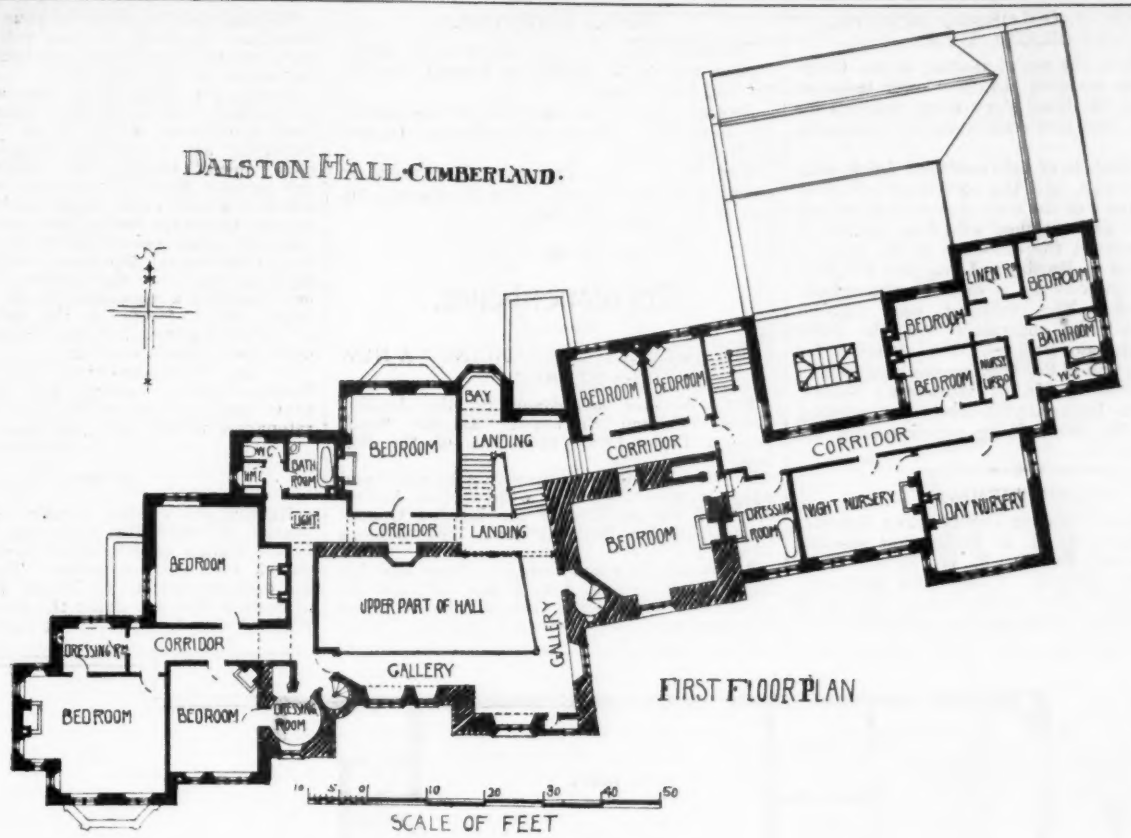
INK PHOTO SPRAGUE & CO LTD 4 & 5 EAST HARDING STREET FETTER LANE E.C.

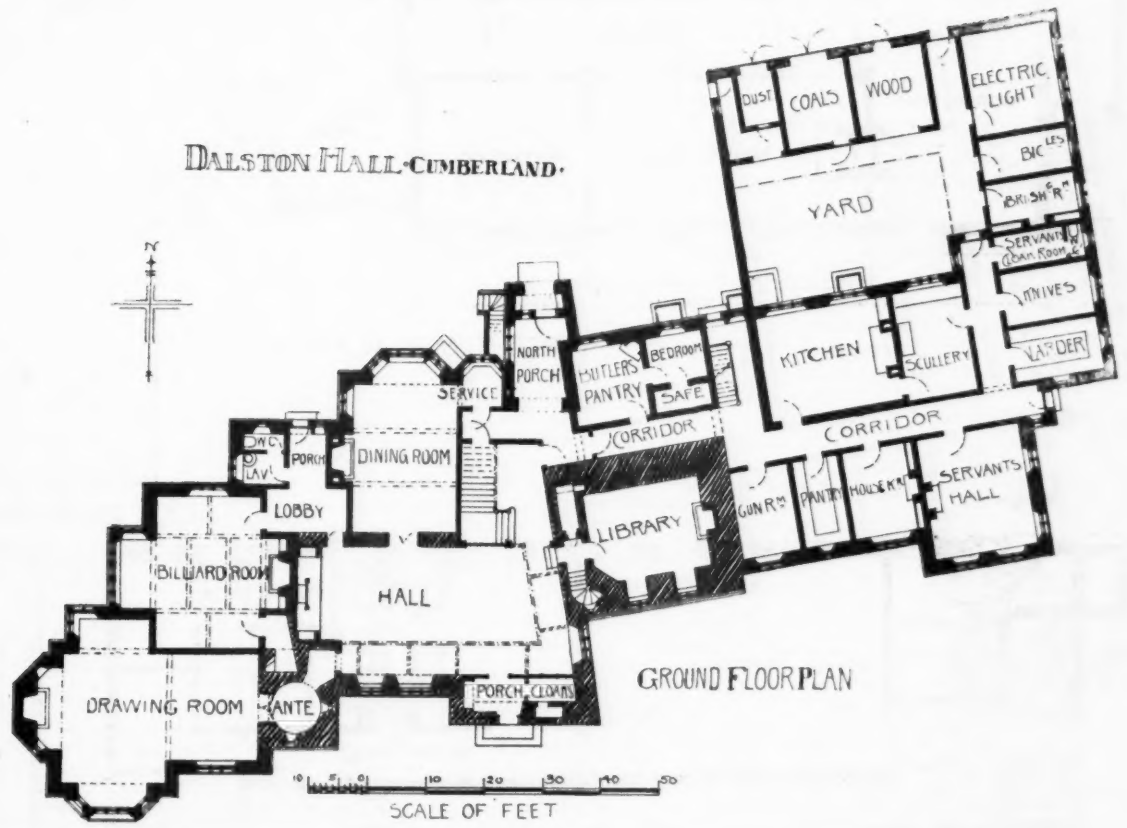
EXTERIOR.

INTERIOR.

INK-PHOTO, SPRAGUE & Co. L.TD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

THE ELKS CLUB, COLORADO SPRINGS, U.S.A.—Mr. T. Maclaren, A.R.I.B.A., Architect.





name of its architect. It appears, however, to be a building of the Renaissance period.

From some crudities in the design and detail, it would seem not improbable that it was by a local architect who was not in touch with the best architectural learning of the period. But we think all our readers will agree that it is a most remarkable and original architectural conception, in general plan and design. We never came across anything like it before, and on seeing M. Allard's drawings at the Salon, we felt a wish to bring so interesting a design to the knowledge of our readers, and M. Allard kindly consented that his drawings should be photographed for reproduction in this journal.

DALSTON HALL, CUMBERLAND.

THE Dalston Hall Estate became the possession of Mr. E. W. Stead in the latter part of 1897, and early in the following year extensive additions were commenced to the old building, together with new stables, lodges, farmhouse, etc.

The tower is one of the numerous examples of Border Pele towers erected during the reign of Henry IV., consisting of a vaulted chamber on the ground floor and a room over in each story, with a fighting deck and watch-tower on the top. A century or so later buildings were erected westward, of a somewhat pretentious nature, for the family of the Dalstons, who were now of some importance, and eastward for their retainers and for stores. But the fortunes of the Hall shared the misfortunes of the family, and for several generations previous to Mr. Stead's purchase it was used as a farmhouse and surrounded by farm-buildings, all dilapidated and going to ruin.

In making alterations the old walls, as indicated on the plans by hatched lines, were retained as far as possible, and the new work was added in a style in harmony with the old. The north porch was built recently, together with a new drive, thus somewhat altering the *motif* of the original planning.

The names of the various contractors were as follows:—Foundations, Messrs. Beaty, Carlisle; builders, Messrs. Rathbone, Atherton, Lancs; joiner, Mr. G. Black; fireproof floors, the Carlisle Fireproof Floor Co.; plasterers, Messrs. Ormerod; plumbers, Messrs. Thomson; slater, Mr. J. Kellet; painter, Mr. W. Ballantyne, all of Carlisle; heating, Mr. J. Grundy, London; electric lighting, Messrs. Verity, London; wrought-iron casements, Messrs. Cuttal, Braintree; ranges and grates, Messrs. Longden, Sheffield.

J. W. BENWELL.

ELKS CLUB, COLORADO SPRINGS, COLORADO, U.S.A.

THIS club is the social feature of the Order of Elks, and occupies the two lower floors of the building, the third story being reserved for lodge room and accommodation in connexion with it.

The building is of light-coloured brick with stone trimmings, and the roof is of red tiles. The upper story of the main elevation is formed into a frieze and enriched with four shields on which are carved the emblems of the order—Charity, Justice, Brotherly Love, and Fidelity. The interior woodwork is of birch throughout and stained. The building cost $46,000 (8,200*l.*), and the contractor was Mr. John Hill, of Colorado Springs. The sketches for plans and design of the building and supervision of details were by Mr. T. MacLaren; Messrs. Douglas and Hetherington made the working plans, and Mr. L. A. Pease superintended the construction.

COMPETITIONS.

KINGSTON-ON-THAMES ELEMENTARY SCHOOL.—The assessor, Mr. T. J. Bailey, has selected the design sent by Mr. F. W. Roper, of 9, Adam-street, Adelphi. There were ten competitors in all. The assessor spoke highly of the general merit of the designs and plans.

BOOKS RECEIVED.

TRANSACTIONS OF THE SOCIETY OF ENGINEERS FOR 1903. Edited by Perry F. Nursey. (E. and F. N. Spon.)

MOLESWORTH'S POCKET-BOOK OF ENGINEERING FORMULÆ. Twenty-fifth edition. (E. and F. N. Spon. 6s.)

THE LAW AND PRACTICE RELATING TO PRIVATE STREET WORKS. Fourth edition. (E. and F. N. Spon. 12s. 6d.)

Correspondence.

"UNLAWFULLY COMMENCING" A NEW STREET.

SIR,—We are summoned by the London County Council to appear at the South London Police Court at 2 p.m. on the 30th inst.

1. For unlawfully commencing to alter and adapt a street or way without first having obtained the sanction of the London County Council, under Building Act, 1894, sections 10 and 200, 1 (a).

2. Unlawfully commencing to form and lay out a street without having first obtained the sanction of the London County Council, under Building Act, 1894, sections 7 and 200 (1) (a).

We shall be glad if any of your readers, who have been similarly worried, will kindly communicate with us, because we intend to defend the action of the Council.

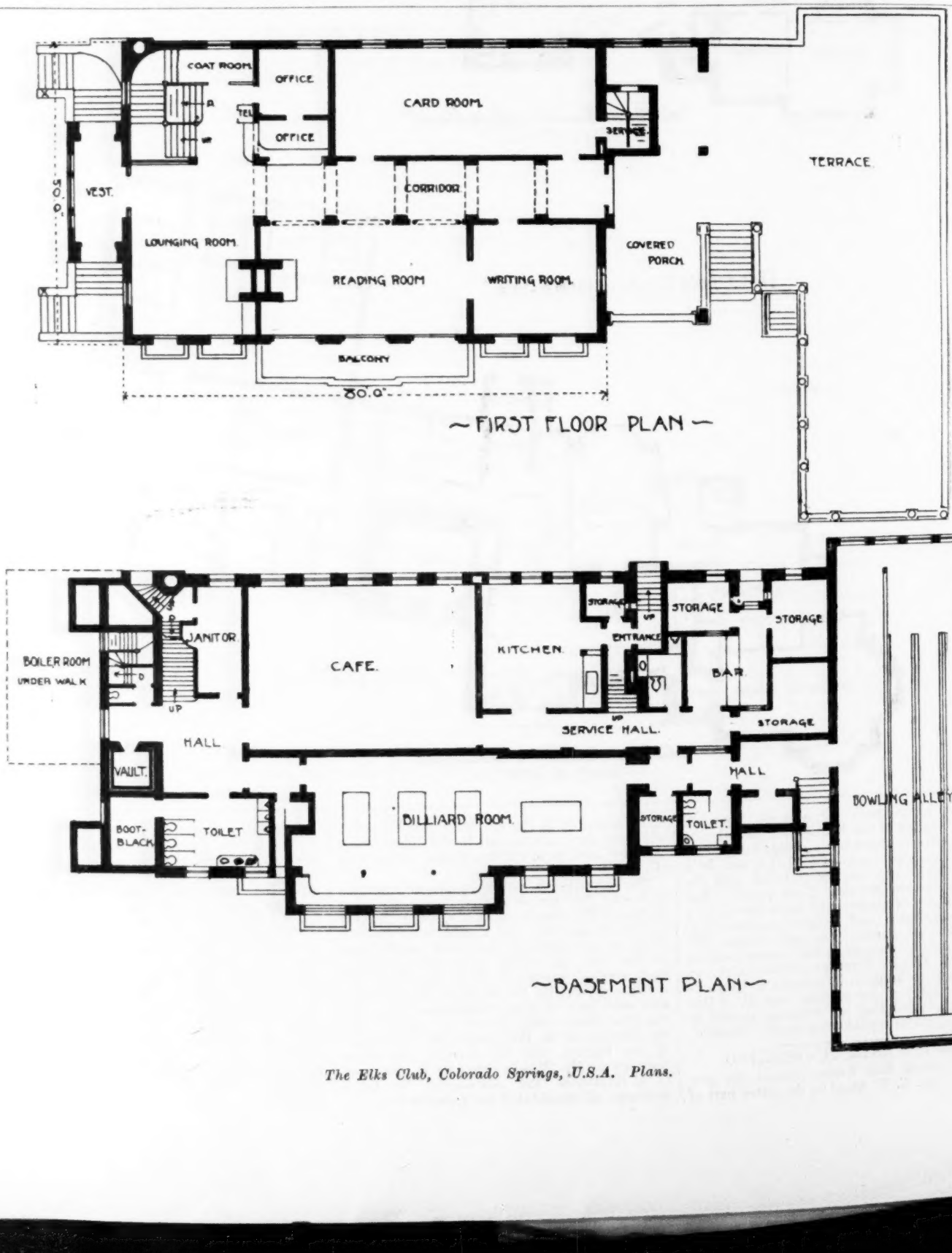
During the whole of the time we have been in Fulham (now nearly four years) they have been a constant worry to us. The District Surveyor has repeatedly complained about most absurd things. The roadway here is our private freehold property, with a gate, which is closed every night, and only opened by our caretaker during the day.

A few other persons have bought freehold land abutting on the same roadway, with a right of way over the roadway, and we are now building a warehouse at the back of the house, which fronts on the public roadway of Parson's-green, but such warehouse abuts upon our private roadway.

To us, it appears most unfair that the London County Council has the power to prove itself a source of expense and worry to ratepayers without any just cause.

J. H. HEATHMAN AND CO.

RESTORATION OF THE PARISH CHURCH, WALBERTON, SUSSEX.—The reopening of the Walberton parish church, after having been restored, took place recently. The restoration has been carried out by Messrs. Bell and Son, of Saffron Walden, under the direction of Mr. Richard Creed, architect, of London.



The Elks Club, Colorado Springs, U.S.A. Plans.

The Student's Column.

ARCHES.—XXV.

WE have already seen that the ribs of the centring are supported on horizontal timbers parallel to the soffit of the arch at, or a little above, the springing, or to the inner surface of the piers or abutments, and that intermediate supports are also employed as may be required. To facilitate the removal of the ribs and centring generally, hard wood wedges are inserted beneath these timbers and the supporting framework so that they can be driven out at the proper time. The wedges are known as *striking wedges*, and the operation of removing them is termed *striking the centring*.

Ordinary striking wedges are made in pairs varying from 1 ft. to 2 ft. long, by 6 in. wide, and having a taper of from 1 to 5 to 1 to 10. As it is necessary to remove the centres very gradually, especially when the arch is of large span, the taper of the wedges must be small, and should be in an inverse ratio to the span of the arch.

For the purpose of insuring uniformity in the lowering of the centres, the whole series of wedges must be driven out with much care. The usual practice is to scribe a mark on each pair of wedges, and all of them are then driven out for a specified distance. Another mark is then made on the wedges, and they are again driven out for the defined distance. By further repetition of these operations, the whole of the wedges are finally removed by perfectly regular and equal stages.

Compound wedges are frequently employed instead of separate pairs of folding wedges. Fig. 115 represents a pair of striking plates A and B, with a compound wedge C between them. The lower striking plate B is a stout beam, suitably notched on the upper side, and rests upon the supports provided for the centring; the upper striking plate A is similarly notched on the under side, and is immediately below the centring, the ribs of which rest directly upon it. The wedge C separates the striking plates, being held in place by tapered keys, or folding wedges, *d*, *d*, driven behind its shoulders. When the centring is to be struck these keys or wedges are driven out, and, as the compound wedge C is slowly driven back, the upper striking plate is gradually lowered.

The wedge C usually extends along the full width of the arch, and, through the striking plate A, supports one end of all the ribs. It is usually from 10 in. to 12 in. square and the notched sections are from 4 ft. to 6 ft. long. The surfaces of the wedges should always be lubricated when the centring is erected, so as to facilitate the subsequent operation of striking. In arches of from 70 ft. to 100 ft. span each rib is generally supported by compound wedges placed transversely to the line of the posts or piles supporting the entire centring.

Fig. 112 shows one of the pairs of striking plates used in the centring of London Bridge.

In the centring introduced by Sir Charles Hartley (see Fig. 110), each lagging could be struck separately by lowering the supporting wedges or screws. Striking plates for the support of the entire arch were thus rendered unnecessary.

An ingenious method of striking arch centring by means of sand was first devised by M. Baudemoulin, a French engineer. The centring was supported on strong bags filled with sand, and to lower the centring the sand was allowed to escape through openings cut in the bags. This method was afterwards improved by M. de Sazilly and applied at the Pont d'Austerlitz in Paris by M. Bouziat. The apparatus is thus described *:—"The lower striking-plate consists of a timber platform, on which stand a number of vertical plate-iron cylinders, of nearly 1 ft. in diameter and 1 ft. in height. The lower end of each cylinder fits on a circular wooden disc about ¾ in. thick. About 1¼ in. above the base of each cylinder are four round holes, of about ¾ in. in diameter, stopped with corks. Each cylinder is filled about two-thirds or three-quarters full of clean, dry sand; and upon the sand rests the lower end of a cylindrical wooden plunger loosely fitting the cylinder, which plunger is, in fact, the lower end of one of the upright posts of the framework of the centre. The joint between the plunger and the cylinder is stopped with plaster, to protect the sand from moisture. When the centres are to be struck, the plugs are taken out of the cylinders, and the sand, running out of the holes, allows the centres to sink slowly and steadily. The sand, if necessary, may be loosened with a hook, to make it run freely; and it must be cleared away from the holes as it runs out."

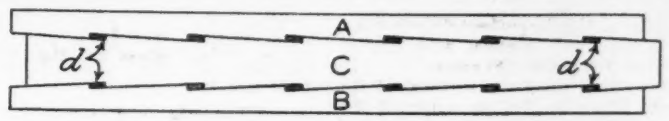


FIG. 115

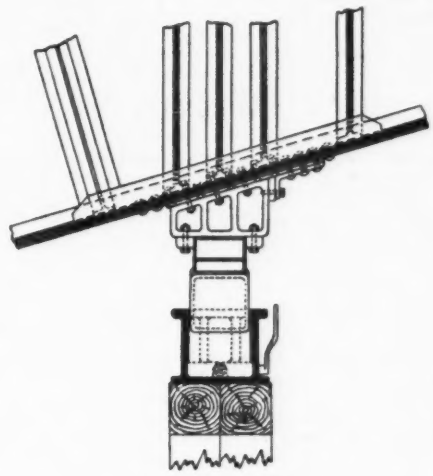


FIG 116

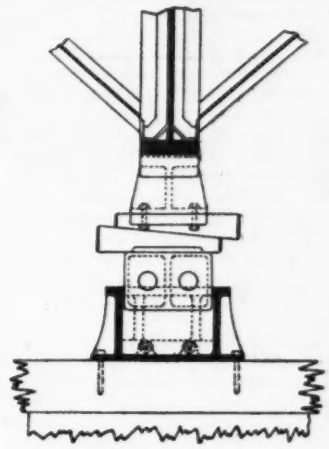


FIG 117

The same device was also applied in striking the centres of the Pont de l'Alma in Paris.

In the case of the King Edward VII. bridge, at Kew, the steel ribs, one of which is represented in Fig. 113, were carried on sand boxes placed below the points A and B. The details of construction of the sand boxes are shown in Figs. 116 and 117. The sand boxes consisted of rectangular cast-iron chambers, measuring 2 ft. by 1 ft. 4½ in. internal dimensions, by 1 ft. 6 in. deep overall, and were secured to the timber framework below by 1½ in. coach screws. Each box was partly filled with clean, sharp sand, on which was set the cast-iron plunger, as shown in the drawings, leaving space for the insertion of a pair of wedges, each measuring 2 ft. 6 in. long, with a taper of 2½ in. Screwed plugs were fitted into the lower part of the box for running off the sand, and in Fig. 116 one of these is shown with a spanner in position. The masonry arches of the bridge were completed in October, 1902, but the striking of the ribs was not undertaken until the following year. The sand boxes were found to answer their purpose admirably, and the ribs were regularly lowered at the rate of 1 in. in forty minutes. When the centring was entirely clear of the arches, the lagging timbers were removed, and the ribs were taken away in sections after the joints had been cut.

Although the use of sand boxes in connexion with bridge construction is comparatively recent, the same principle was undoubtedly employed thousands of years ago for lowering heavy blocks of stone into position.

It sometimes happens that the sand refuses to run from one or more of the boxes in consequence of frost or from other causes, and, unless detected in time, such an occurrence may cause injurious strain in an arch and even threaten its failure. Hence some engineers prefer to effect the striking of the centring by means of jacks, the action of which can be positively controlled throughout the operation.

Some difference of opinion exists as to the period that should elapse between the completion of an arch and the striking of the centres. A not infrequent practice in tunnel, sewer, and culvert construction is to remove the centring directly after the arch has been turned and about half the spandrel filling has been put in position. Many bridge engineers permit the centring to be thus taken away, without paying much attention to the condition of the mortar. A far wiser course is to allow adequate time for the mortar to harden, especially when lime mortar is used, although it is a good plan to lower the centring slightly as soon as the keystone has been inserted, so that all the joints may be subjected to a certain amount of pressure.

The precise length of time that ought to be allowed to elapse before the final striking of the centring must necessarily depend upon the kind and quantity of mortar employed in the joints, and sometimes upon atmospheric conditions.

Table XII. shows approximately the effect of time on the setting of various kinds of mortar. The data from which this table has been prepared include the results of a large number of experiments on mortar freely exposed to the air, but it should be remarked that the process of setting is obviously retarded in the case of mortar in masonry joints, where air is almost entirely excluded.

In brick arches, it must be remembered that a very considerable proportion of the arch ring consists of mortar, owing to the large number of radial and concentric joints. Hence the removal of the centring at too early a period tends to produce a very perceptible deformation, and in some cases may seriously threaten the safety of the structure.

TABLE XII.—EFFECT OF TIME ON THE SETTING OF MORTAR, IN TERMS OF TENSILE STRENGTH.

Description of Mortar.		One Week	One Month	Three Months	Six Months
		lb. per sq. in.	lb. per sq. in.	lb. per sq. in.	lb. per sq. in.
Lime	1 : 3	9	18	33	40
Portland Cement	1 : 10	25	41	65	75
,,	1 : 8	37	65	112	136
,,	1 : 6	93	125	180	216
,,	1 : 3	135	170	255	305
,,	1 : 2	195	260	350	405
,,	1 : 1	277	360	430	470
,,	1 : 0	460	550	625	650

When air is excluded from lime mortar by surrounding masonry, it is safe to say that setting of the interior portions cannot be completely effected for years. Indeed, lime mortar taken from the walls of ancient buildings has been found, with the exception of a thin outer crust, practically in the same condition as if it had been newly mixed. These considerations point clearly to the advisability of using cement mortar for arch construction.

We have alluded in a previous article to the sinking that always takes place owing to the depression of the centring when still in position. The extent to which an arch will sink after the removal of the centring depends upon the time allowed for setting of the mortar and upon the quality of the workmanship. In several large French arches the depression after striking was very great, evidently owing to bad masonry work.

As an example, we may quote the bridge built by Perronet at Neuilly, in France, the centring sunk 13 in. while still in position, and after its removal a further sinking of 9½ in. took place. The crown of the centring had a radius of 150 ft., but the sinking of the arch was such that for a length of 60 ft. the arch assumed the form of an arc with a radius of

* Exposition Universelle, 1862.—Notices sur les Modeles, Cartes, et Dessins Relatifs aux Travaux Publics.

244 ft. In spite of this important deformation, however, the arch still stands, after having been in existence for about 130 years.

It is recorded that upon the removal of the centring from Waterloo Bridge none of the arches sank more than 1½ in., and, as mentioned in Article XXI., the maximum depression of the great arch at Plauen was less than 1 in. These two cases show the advantage to be derived from the scientific design and construction of arch centring.

ARCHES.—XXVI.

IN this, the concluding article of the present series, we give some notes relative to the theory and construction of domed structures. Apart from such structures as the Treasury of Atreus (Fig. 7, p. 18 *ante*), which were not correctly representative of the principles of the arch, many fine domes were erected in ancient times. Chief among these may be mentioned the domes of the Pantheon, Rome; Santa Sophia, Constantinople; Santa Maria del Fiore, Florence; and St. Peter's, Rome. These still remain as a testimony to the courage and skill of their designers, but, with the exception of the Pantheon, the construction of these monumental works is incorrect. Fissures and cracks have appeared from time to time in the three last mentioned, and reinforcement has been necessary to prevent failure.

In spite of the fact that correct principles were demonstrated in the early part of the last century, some designers continue to adopt methods of construction that are inaccurate. Our object in this article is to point out methods that avoid the defects not infrequently evidenced in the past, and to induce our readers to make further study of a most interesting branch of architectural design, which has not been practised so generally as might be desired, owing to lack of confidence in the stability of domed structures of any great size or distinct boldness. An excellent discussion of the whole subject is to be found in a recent communication to the American Society of Civil Engineers by Mr. E. Schmidt, from whose paper the following formulæ and accompanying diagrams have been adapted.

(1) We will first consider the case of a truncated dome, to determine the stress on the crown ring, which is always a compressive stress.

Let S = the tangential peripheral stress due to the unit pressure on the ring.
p = the unit pressure, and
R = the radius of curvature.

Then:—

$$S = p\ R \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

The stress per unit length of meridian and per unit length of circumference is found by drawing the triangle of forces, with w = the weight per square unit of spherical surface, as a known quantity, as in Fig. 118, and by comparing this with the similar triangle $R\ r_x\ h_x$, where r_x is the length of the parallel.

Whence:—

$w : p_x : : r_x : h_x$, or $p_x\ r_x = w\ h_x$,

and the ring stress in the crown may be written:—

$$S = w\ h_x \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

where h_x is the height of the crown ring above the equatorial base of the dome.

(2). Considering now a closed dome with the base at the height h_y above the imaginary equatorial base, as in Fig. 119, determine the tangential meridional thrust, which always results in compressive stress, and determine, also, the circumferential ring stress, which at the base is always tensile.

Two principal stresses exist at the base of every dome—the tangential meridional thrust T, and the horizontal ring stress B in the bed-joint. These two stresses must balance each other, and they are caused by the weight W of the dome. The value of W is represented by the equation:—

$$W = 2\ R\ \pi\ a\ w \quad . \quad . \quad . \quad . \quad (3)$$

where R = radius of curvature.
a = unit of length of circumferences (measured approximately by its chord).
w = the weight per square unit of spherical surface.

Taking any given value for W, the triangle of forces W T θ is drawn, as in Fig. 119, and this, compared with the similar triangle $r_y\ h_y$ R, leads to the proportion W : T : : r_y : R. Whence:—

$$T = W \frac{R}{r_y} \quad . \quad . \quad . \quad . \quad . \quad . \quad (4)$$

or, substituting the equivalent of W as in equation (3):—

$$T = \frac{R}{r_y} 2\ R\ \pi\ a\ w \quad . \quad . \quad . \quad . \quad (5)$$

Taking the unit value of B the horizontal ring stress, and denoting it by b, the conditions of equilibrium round the entire base of the dome demand the condition:—

$$T = 2\ r_y\ \pi\ b \quad . \quad . \quad . \quad . \quad . \quad (6)$$

and, considering the value of T as in equation (5), we have:—

$$b = \frac{R}{r_y^2}\ a\ w \quad . \quad . \quad . \quad . \quad . \quad (7)$$

Now, taking the unit value of T and denoting it by t, we find:—

$$t = \frac{T}{2\ r_y\ \pi}$$

or, considering the value of T, as in equation (5):—

$$t = \frac{R^2}{r_y^2}\ a\ w \quad . \quad . \quad . \quad . \quad . \quad (8)$$

Thus, the unit ring stress b, at any point round the circumference of the base is of the same intensity as the unit tangential meridional thrust t, but these stresses are always opposite in sign.

Making the following substitutions: $a = R - h$, and $r_y^2 = R^2 - h_y^2$, and using the + sign to indicate tension and the − sign compression, we have:—

$$t = + \frac{R^2}{R + h_y}\ w, \text{ and } b = - \frac{R^2}{R + h_y}\ w \quad . \quad (9)$$

(3). By combining the conditions assumed in cases (1) and (2) the stresses at any point in a complete hemispherical dome can be determined.

Let it be assumed, as in Fig. 120, that the closed dome represented in Fig. 119 is placed above the open dome in Fig. 118, so as to form a complete hemispherical dome. Then the stresses at any parallel having the radius r and the height h above the equatorial base will be:—

$$t = + \frac{R^2}{R + h}\ w, \text{ and } b = - \frac{R^2}{R + h}\ w + w\ h \quad (10)$$

The above expression for the base ring stress is seen to include a negative term due to the upper part of the dome and a positive term due to the lower part. It should be observed that special values of t and b occur at the crown, where $h = R$, and the value of

$$t = + w \frac{R}{2}\ w, \text{ and the value of } b = + \frac{R}{2}\ w,$$

both stresses being compressive.

Again, at the equatorial base, where $h = 0$, the value of $t = + R\ w$, and of $b = -R\ w$.

Hence, as b passes from compression at the crown to tension at the base, it is obvious that there must be some point, analogous to the point of contrary flexure in an *encastré* beam, where the value of $b = 0$. The height at which $b = 0$ is $h = 0{\cdot}618$ R, and the corresponding angle from the vertex is $\theta = 51° 49'$.

The point at which $b = 0$ is termed the joint of rupture.

From the foregoing, it is evident that the parallel at a height of 0·618 R above the equatorial base divides the surface of a full dome into two parts—the upper part being in compression in every direction, while the lower part is in compression and in tension. The meridional stress is compressive, and the ring stress tensile, commencing with zero value at the joint of rupture and reaching a maximum value at the base where $b = -R\ w$.

We are now able to realise very clearly that, as tensile stress is to be found in all courses below the joint of rupture, brick masonry is not altogether suitable for the construction of complete semi-hemispherical domes, owing to its inability to resist tension. But brick may be used with perfect safety in domes extending from the crown down to an angle of 51° 49', providing it is confined at the base, so delimited, by a ring of material adequate to resist the tensile stress involved.

Domes of stone masonry are governed by the same conditions, but they may be built to extend below the joint of rupture, providing the method of construction is such as to provide adequate resistance to tensile stress.

(4). By a further combination of the conditions assumed in cases (1) and (2) the stresses in the crown and base rings for any truncated dome, such as that in Fig. 121, can be ascertained as

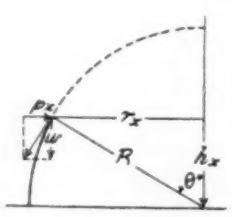


FIG. 118

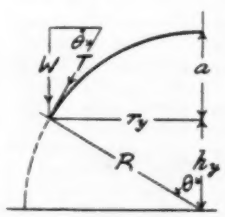


FIG. 119

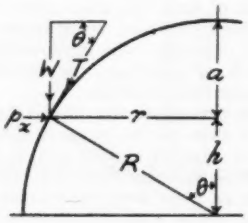


FIG. 120

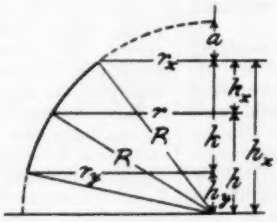


FIG. 121

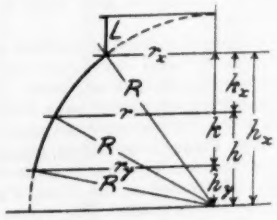


FIG. 122

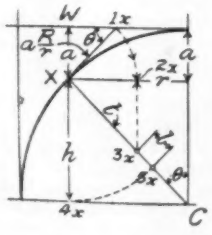


FIG. 123

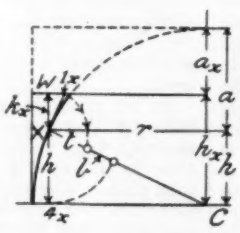


FIG. 124

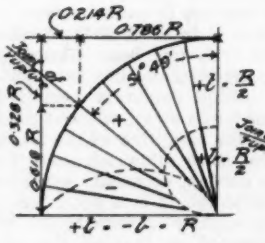


FIG. 125

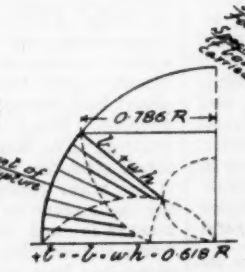


FIG. 126

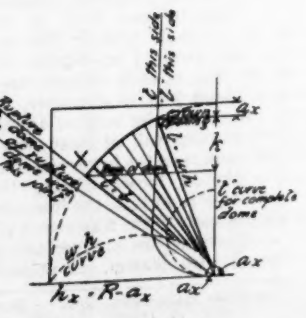


FIG. 127

well as those at any intermediate point between the two parallels.

In Fig. 121, let k be the vertical distance between the base and crown rings, and k_x the vertical height of the crown ring above any parallel r. Then:—

$$t = + \frac{R^2}{r^2} k_x w$$

$$b = - \frac{R^2}{r^2} k_x w + w h \quad . \quad . \quad (11)$$

The last term in the equation for b represents the compressive ring stress for that part of the dome below the parallel considered. Hence when h reaches the lower limit h_y, the value of $w = 0$ in that term.

Again, at the crown ring, $t_x = 0$ and $b_x = w h_x$, while at the base $t_y = + \frac{R^2}{r_y^2} k w$ and $b = - \frac{R^2}{r_y^2} k w$.

Special joints of rupture occur in the case of truncated domes where the bases of such domes are below the joint of rupture already defined. Reference to this point will be made later.

(5). If to an open dome, such as that represented in Fig. 121, we add a further load L by the imposition of a lantern, or other architectural feature, upon the crown ring, as in Fig. 122, the formulæ already stated require modification.

As an additional load of this character is distributed over ever-increasing circles during transmission from the crown ring down to the base, the unit load at any parallel r will be:—

$$l = \frac{L}{2 r_x \pi}$$

and the stress at any parallel r, will be:—

$$t = + l \frac{R r_x}{r^2} + \frac{R^2}{r^2} k_x w \quad . \quad . \quad . \quad . \quad (12)$$

$$b = \pm l \frac{R r_x}{r^2} - \frac{R^2}{r^2} t_x w + w_y h \quad . \quad . \quad (13)$$

The following are special values of t and b:—

At the crown when $r = r_x$; $k_x = 0$; and $h = h_x$:—

$$t = + l \frac{R}{r_x}$$

$$b_x = + (w + l) h_x$$

$$b = + l \frac{R}{r_x} + w h_x$$

At the base, when $r = r_y$; $k_x = k$; $w_y = 0$; for $h = h_y$. Hence:—

$$t = + l \frac{R r_x}{r_y^2} + \frac{R^2}{r_y^2} k w$$

$$b = - l \frac{R r_x}{r_y^2} + \frac{R^2}{r_y^2} k w$$

Fig. 123 is a diagram showing a graphical method of determining the magnitude of the principal stresses for any point X of a full dome.

Those stresses for a spherical dome are:—

$$t = + \frac{R^2}{r^2} a w \text{ and } b = - \frac{R^2}{r^2} a w + w h$$

and can readily be represented graphically. The starting point is the quantity $W = R a w$, where W = the weight of a zone sector having the height a and a base equal to a unit of length at the equator.

In Fig. 123 W is represented for $w = 1$ by the line W X = a. The mode of constructing the diagram is as follows:—

For any point X and the radial C X draw W 4_x, and draw the tangent X 1_x, perpendicular to C X. With X as the centre, describe the arc $1_x 2_x$, and draw the vertical $2_x 3_x$. With the centre X and radius X $4_x = h$, describe the arc $4_x 5_x$, meeting the radial C X. Then X 3_x represents t, and $3_x 5_x$ represents b, as noted on the diagram.

By a similar method, the diagram Fig. 124, is constructed for a truncated dome.

Repeating the construction for a number of radial ordinates, we get the diagrams Fig. 125, 126, 127, where the values of t are represented by thin lines except at the base and the values of b by thick lines.

It should be noted that above the joint of rupture, b is compressive, and below it tensile, providing the base is at a height less than 0·618 R above the equatorial base. By comparing Figs. 125 and 127, it will be seen that in the closed dome the values of b are much less than in the open dome, and that the values of t are correspondingly greater.

In order that the masonry of a dome may be able to withstand tensile stress it is desirable that the coursing should be designed so that no reliance is placed on frictional resistance or the adhesive strength of the mortar. To comply with this condition, the blocks below the joint of rupture should be so shaped that each circumferential unit length of bed may be able to withstand a thrust equal to t, and that any cross section may be able to withstand tensile stress equal to b.

These conditions could probably be best obtained by designing the masonry in shouldered and tenoned courses. The depth of the tenons could be decreased with the diminution of the stress b from the base up to the joint of rupture. Below this joint the stone should possess high tensile strength, and above it the chief qualification of the stone should be high compressive strength.

Table XIII. is given for general guidance in the practical design of domed structures, but the designer ought always to work upon definite information as to the precise physical qualities of the materials to be used in the construction of any proposed dome.

TABLE XIII.—AVERAGE WEIGHT AND STRENGTH OF MATERIALS SUITABLE FOR THE CONSTRUCTION OF MASONRY DOMES, AND RATIO OF DIAMETER TO THICKNESS.

Material.	Weight.	Safe working stress in lb. per sq. ft.		Safe diameter of dome (thickness =1 ft.).
		Compression.	Tension.	
Granite	170	215,000	27,000	316
Limestone	150	130,000	16,000	212
Marble	165	144,000	18,000	218
Sandstone	140	170,000	20,000	284
Brick in lime	110	18,000	900	16
Brick in cement	120	36,000	5,400	90
Concrete	150	36,000	7,000	94

From what was said in the earlier part of this article, it is clear that if the springing joint of a dome is placed at an angular distance of not more than 51° 49′ from the crown, or pole, as in Fig. 130, no tensile stress will be evidenced in any direction, except in the bed joint of the lowest course. Therefore, in such a case the only auxiliary reinforcement required to insure stability will be a course of masonry bonded so as to resist the outward pressure that tends to burst the dome. A strong band of steel or concrete-steel would, of course, answer this purpose equally well.

In a masonry dome where a tension zone exists, the whole of this zone may be reinforced by a sheathing of steel plate, able to resist the tensile stresses involved as a substitute for courses of shouldered and tenoned masonry. But if the dome is intended to form a prominent feature in a building of monumental character, the use of steel reinforcement in this manner would be quite out of place, and the entire zone, from the joint of rupture down to the base, should be of masonry, specially designed to withstand the calculated ring stresses.

WESTMINSTER CITY COUNCIL.

THE usual fortnightly meeting of this Council was held on Thursday last week, at the City Hall, Charing Cross-road.

The General Purposes Committee reported the receipt of a communication from the City Corporation enclosing copies of resolutions passed at the Conference of delegates from the Local Authorities, within the London Telephone area, with regard to the proposed purchase by the Government of the National Telephone Company's undertakings. The communication was acknowledged.

A communication was received from the Local Government Board approving the proposal of the City Council to appoint two temporary women sanitary inspectors.

Public Health (London) Act, 1891.—The Committee reported the receipt of a letter from the London County Council in regard to the administration of this Act, and suggesting that representatives of the Borough Councils should meet to discuss the matter at a conference which they had convened for July 17 next, and asking the City Council to appoint representatives. It was agreed to inform the London County Council that, in the opinion of the City Council, the matter was one for the consideration of the Metropolitan Borough Councils, and that any such conference should be of an inter-borough nature only. It was also agreed to address a communication to the Corporation of the City of London, and the various Metropolitan Borough Councils, stating the view of the City Council on the matter.

Draining and Paving of Stables.—It was agreed to inform the London County Council, in answer to an inquiry from that body, that the City Council had experienced but little difficulty in enforcing the by-law as to the draining and paving of stables.

Holborn to Strand Improvement.—On the recommendation of the Works Committee, the plans submitted by the Engineer to the London County Council with regard to the paving of Aldwych, Kingsway, and Catherine-street, were approved, and it was agreed to ask the London County Council to provide sunk orderly bins in the footways of Aldwych, Kingsway, and adjacent streets, similar to those placed on Waterloo Bridge.

Golden-square Garden.—It was agreed to take over and maintain this garden in the event of its being thrown open to the public.

Advertisement Hoardings.—The Committee reported having considered a letter from the Royal Institute of British Architects with reference to the abuse of buildings by advertisement hoardings, quoting, as an instance, the advertisements that cover the façade of the building adjoining Bow Church, in Cheapside, where the windows are partially blocked by advertisement boards. The letter referred to the illogical condition of municipal regulations which allowed the erection of those structures in front of window spaces. It was agreed to inform the R.I.B.A. that the Council were in accord with its views.

OBITUARY.

MR. LAW.—We have to announce the death, a few days since, at Northampton, aged 64 years, of Mr. Edmund Law, until recently County Surveyor of Northamptonshire, and Surveyor to the local Church Charity Trustees. Mr. Law was the son of the late E. F. Law, to whom he was articled, and whom he succeeded as County Surveyor, an office he resigned through ill health three years ago. He was elected a Fellow of the Royal Institute of British Architects in 1881, and was a Fellow of the Surveyors' Institution. In October, 1895, he took into partnership his chief assistant, Mr. Sidney F. Harris, under the style of "Law and Harris, architects and surveyors," of Lloyd's Bank-buildings, St. Giles's-square, Northampton; his son, Mr. H. H. Law, subsequently became a member of the firm. Mr. Law was the architect of Nos. 47-9, Gold-street; Goodyear-chambers, at the corner of Lower Mounts, Abington-street; and the new County Council Chamber (1890) at the rear of the (old) County Hall, in George-row, in Northampton. He carried out the restoration of the chancel of the parish church of St. Mary, at Dallington (the general restoration having been begun by him and his father in 1880); he made the designs for the reredos, in Caen stone and alabaster, of St. Giles Church, and restored the parish church of All Saints, Northampton. Messrs. Law and Harris gained the first premium with their plans and designs for the Barry-road Board Schools, Northampton, to receive 1,370 children, with swimming bath and laundry, and erected under Mr. Sidney Harris's superintendence. In 1883 Mr. Law made the designs for the stone reredos in the church at Dallington, having twelve niches for statues of the Apostles, nine of which have since been placed in position.

MR. COOPER.—We have also to announce the death, in his forty-sixth year, of Mr. William Cooper, of No. 21, Havelock-road, Hastings, and of Seaford, who carried on an extensive practice as an architect and surveyor in Sussex and was employed in laying out several properties for building purposes in Hastings, St. Leonards, Bexhill, and other places in that part of the county. Mr. Cooper rejoined the Architectural Association in 1884, and three years ago took Mr. H. W. Coussens into partnership, under the style of Messrs. Cooper and Coussens. Mr. Cooper prepared the plans and designs for the extensive alteration and enlargement of Crouch House, at Seaford, for Mr. J. F.

minister; for a residence at Seaford, for Dr. W. P. Morgan; houses and shops at Silverhill; and—we understand—the Hastings and St. Leonard's Ladies' College; he and his partner were architects of houses in Downsroad, and the residential flats in Mount Pleasant-road, Hastings.

GENERAL BUILDING NEWS.

CHURCH, PORT SUNLIGHT.—On the 8th inst. Mrs. W. H. Lever formally opened Christ Church, Port Sunlight, which has been built at a cost, including fittings and equipment, of 28,000*l.*, and presented to the village by Mr. W. H. Lever. The church, which is of Helsby red sandstone, will seat 600 persons, but can accommodate 1,000. It is 151 ft. in length by 51 ft. in width, with transepts projecting about 22 ft., and there is a tower at the south-west corner carrying a peal of bells. The chancel is 47 ft. by 27 ft., and has accommodation for a choir of fifty there being at the end three stained-glass windows, erected by Mr. Lever in memory of his late father and mother. The organ of four manuals has been built by Messrs. Henry Willis and Sons, of London. The roofs of the building are open timbered of pitch-pine, while the pews and pulpit are of oak, the aisles and chancel being floored with black and white Italian marble pavements. The general building has been carried out by Messrs. Lever's building department, the font, pulpit, lighting, stained glass, etc., having been entrusted to contractors. The architects were Messrs. W. and Segar Owen, of Warrington.

NEW CHURCH, NORTHAMPTON.—The foundation-stone of Christ Church, Northampton, was laid on the 8th inst. It is proposed to erect the nave and aisles and the two transepts, and for the present a temporary chancel will be arranged out of a portion of the nave, and temporary vestries out of a portion of the north transept. The accommodation provided in this first portion will be for about 600, and the estimated cost 5,800*l.*, the amount of the accepted tender submitted by Mr. Robert Cosford, builder, of Northampton. The architect is Mr. M. H. Holding.

NEW CHURCH, SHOREHAM, SUSSEX.—The opening of a new lecture hall and class-rooms in Buckingham-road, Shoreham, took place recently. The work has been carried out from the designs of Mr. E. J. Hamilton, architect, Brighton, by Mr. W. Willett, builder. The new building is part of a scheme which, when completed, will comprise a church to accommodate about 300 to 320, with nave, shallow transepts, and western gallery. The gallery staircase will be contained in a small tower, with octagonal lead roof. In the rear of the church the buildings already completed comprise lecture hall, 29 ft. square, with vestry, and five class-rooms, three of which are divided off from the lecture hall by roller shutters, adding some twenty sittings to the hall when required. The walls are faced externally with stock bricks of buff colour, with red terra-cotta dressings, the roofs being covered with red tiles. It is intended also to erect a manse upon the site.

ADDITIONS TO ST. PETER'S CHURCH, LOWESTOFT.—The Lord Bishop of the Diocese dedicated recently the new chancel, side chapel, reredos, etc., at St. Peter's Church, Lowestoft. The architect for the new work is Mr. E. P. Warren, Westminster, and the contractors Messrs. Collins and Godfrey, of Tewkesbury. The new portion of the building forms part of a complete scheme for a new church. The reredos has a carved, coloured, and gilded frame. The centre panel represents the Crucifixion, with the figures of St. Mary and St. John on either side of the cross, and is the work of Mr. R. Anning Bell, who modelled and coloured the panel, which is cast in hard fibrous plaster. The panels of the wings are paintings by Mr. W. D. Adams, of Dorchester. The reredos itself, designed by the architect, has been carried out by Mr. T. E. Jago, Westminster. The hangings above and beside it, as well as those in the side chapel, are by Mr. H. S. Ashwin, of Stoke-on-Trent. The east window has been executed by Mr. Christopher Whall. The sanctuary is paved in large squares of black and white marble. The new nave, when completed, will provide a large congregational area with an unrestricted view of the altar, the aisles being wing passages carried by means of arches through the heavy internal buttresses which resist the thrust of the wide-spanned roof.

NEW CHURCH, BALSALL HEATH, BIRMINGHAM.—The consecration of the Church of St. Barnabas, in Ladypool-road, Balsall Heath (which has now been completed, with the exception of the tower, by the building of the nave), took place recently. The structure has been built of red brick and terra-cotta. The plans for the work were prepared by the late Mr. J. F. Proud, and elaborated after his death by Messrs. W. Hale and Sons.

CHURCH RESTORATION, IDDESLEIGH, DEVONSHIRE.—The old church at Iddesleigh has just been restored. The Church of St. James' is an ancient building in Gothic style, and comprises a chancel, nave, aisles, south porch, over which is a sundial, and an embattled western tower, with pinnacles, containing four bells, of which the first two are dated 1620, and the third, 1629. The tenor has an invocation in old English characters to St. George. Under an obtuse arch in the north aisle is the recumbent, cross-legged effigy of a knight in chain mail, covered with a cyclas. The effigy is reputed to be that of an ancestor of Sir John Sully, K.G. Iddesleigh Church was repaired and partly rebuilt in 1848, at a cost of about 400*l.*, whilst it was restored in 1879 at an outlay of 2,500*l.* A window was put in at the expense of the parishioners to the memory of Stafford Henry, first Earl of Iddesleigh, G.C.B., P.C., who died on January 12, 1887. There are sittings in the church for 120 persons, and the register dates from the year 1538. The present restoration has been carried out at a cost of a little over 200*l.*, and most of the work has been on the old tower. The whole of the stucco, which did not add to the appearance of the building, has been taken off, and the tower has been repointed and thoroughly renovated, whilst the ring of four bells has been rehung. Provision has been left for the reception of two more bells. The organ, which was placed in the church some four or five years ago, somewhat obscured the Iddesleigh window, and the window has now been moved from the north-east end of the church to the tower. The work has been carried out under the direction of Mr. James Hooper, of Hatherleigh, architect.—*Western Morning News*.

TOWER, PARISH CHURCH, LLANEGWAD.—The new memorial tower of the Parish Church of Llanegwad, Carmarthen, was dedicated by the Lord Bishop of St. David's on the 12th inst. It is planned for a peal of bells to be added later on, from the design of Mr. David Jenkins, architect, Llandilo, and built by Mr. W. D. Morgan, contractor, Gwynfe, Llangadock, at the expenditure of 700*l.*

WESLEYAN CHURCH, LIVERPOOL.—On the 2nd inst. the foundation-stone was laid of the new Wesleyan church and schools in Wellington-avenue, Smithdown-road. The church is to be built in the classic style, with the schools as a separate building. It is designed to accommodate 678 persons, with 284 of the seats in the gallery on three sides of the church. There will be three vestries, and the organ will be placed in a recess behind the choir seats. The pews will be pitch-pine, and the ceiling of plaster, with mouldings and enrichments. There will be an arch in front of the organ recess, with enriched spandrils of fibrous plaster, and the main windows will be leaded lights. The school assembly hall will be 60 ft. by 34 ft., and will have an end gallery, and there will be in the school buildings an adults' room and an infants' room, and six additional class-rooms, there being separate entrances for boys and girls. The cost, including the site, will be 10,000*l.* The architects are Messrs. W. J. Morley and Son, of Bradford, and the builders, Messrs. S. Webster, of Bootle.

BAPTIST CHURCH, NORWICH.—The foundation-stone was recently laid of the new Baptist church in Dereham-road. The new church faces north and south, its south elevation looking on to Dereham-road, with a return frontage to Goldsmith-street. The architect is Mr. A. F. Scott, and the church will be of brick with Costessey ware dressings.

WESLEYAN CHURCH, BISHOPSTON, BRISTOL.—In connexion with the scheme for renovating and extending Bishopston Wesleyan Church, the memorial stones of the new church parlour were laid a few days ago. The church parlour will be 34 ft. long and 21 ft. wide, having a coved and panelled ceiling with moulded ribs, all of selected pitch-pine. The cost of the work now in hand will be between 1,200*l.* and 1,300*l.*, and is being carried out from the designs and under the direction of Messrs. Herbert J. Jones and Son, architects, by Mr. T. R. Lewis, builder.

CONGREGATIONAL CHURCH, DOVERCOURT.—A new Congregational Church has been opened at Dovercourt. The site of the church is in Cliff-road. The building is of red brick, with a concrete roof. The windows are filled with lead lights of tinted cathedral glass, with ruby margins, supplied by Messrs. G. Farmiloe and Sons. The additions will be made at the south end, where the tower will be, and over entire length of the extended school-rooms. Mr. H. H. Packer is the architect.

BAPTIST CHURCH, BLACKPOOL.—The foundation-stones of the new Baptist Tabernacle, at Blackpool, were laid on the 15th inst. The new place of worship is being built in Springfield-road. The exterior is in red bricks with stone dressings. On the ground floor seating for 470 is provided, and for 290 additional in the horse-shoe gallery. The school block in the rear contains a large hall, with seating for 300, a ladies' room, and the hall and staircase on the ground floor. The first floor is divided into seven class-rooms. Heating will be by low-pressure hot-water pipes and radiators, and the lighting by electricity. Messrs. W. T. Oldrieve and C. A. Hindle, of Manchester, are the joint architects, and Messrs. Parkinson and Sons, Ltd., of Blackpool, are the builders.

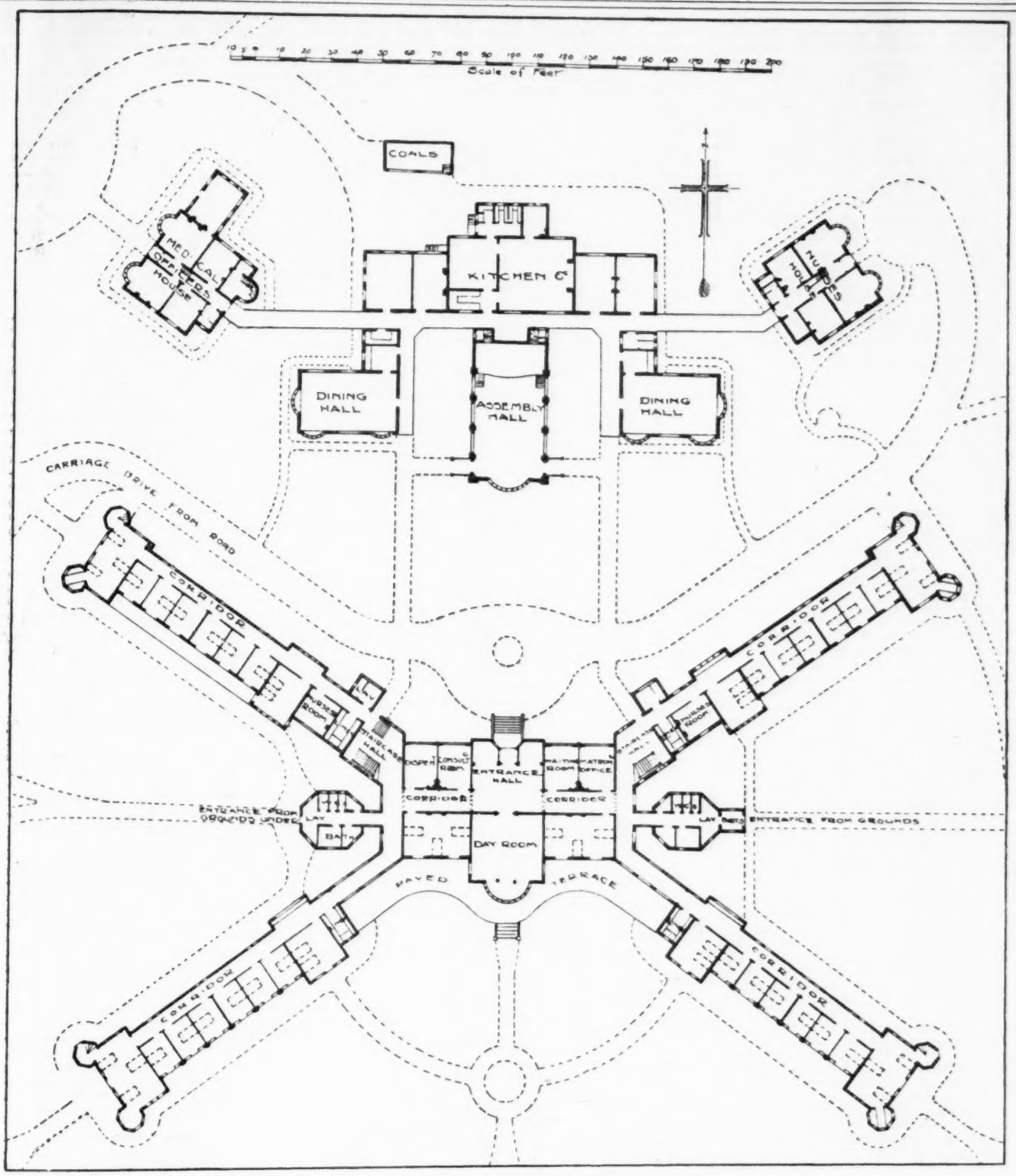
FREE METHODIST CHURCH, WHITLEY BAY.—The Whitley Bay United Free Methodist Church, which was destroyed by fire some months ago, is about to be rebuilt. Mr. W. H. Knowles, architect, Newcastle, was recently instructed to prepare plans and designs for a new church, at a cost not exceeding 3,000*l.* The building, which will be of red pressed bricks with stone dressing, will be constructed by Mr. A. Styan, builder and contractor, Whitley Bay.

FREE METHODIST CHURCH, PRESTON.—The foundation-stones of the new Free Methodist church and schools, which are to be erected in Deepdale-road, Preston, were laid recently. Mr. G. E. Balshaw, of Southport, has prepared plans of the school and church buildings. It is proposed to build the school first, and the anticipated outlay will be about 2,400*l.* With the class-rooms, accommodation will be found in the school for 600 people. A schoolroom, 47 ft. by 32 ft., is to be provided, with gallery at one end, and ten class-rooms eight of which are arranged in one side of the schoolroom and two at the end below the gallery. Four of the class-rooms on the ground floor are so arranged that they can be opened out to the main schoolroom for special occasions, to give additional seating accommodation. A lecture-room, or class-rooms three and four, when thrown together, is capable of seating ninety-five persons. The premises will be heated throughout by hot water. Valves are so arranged that certain rooms can be heated together with the schoolroom, or separately, as required. It is proposed to face the elevations with best Accrington facing bricks, with dressings of Longridge or other approved stone. The internal joiners' work is to be of pitch-pine, varnished, and the external woodwork of red deal, painted.

NEW CONGREGATIONAL CHURCH, HERNE-HILL.—The new Congregational church, at Herne-hill, was opened on the 11th inst. The building stands on a site at the corner of Denmark-hill and Red Post-hill. The design is Gothic of the decorated period. Red bricks and grey terra-cotta are used for the exterior, and light-tinted bricks for the interior. The nave is 76 ft. in length and 30 ft. in width. There are also two side aisles, north and south transepts, chancel, and organ chamber. The architect is Mr. Alfred Conder. At the rear of the church there is a hall measuring 38 ft. by 20 ft., minister's and deacons' vestries, and other accommodation. The church is at present seated for a congregation of 450 persons, but the plan adopted admits of a gradual extension of the accommodation up to about 800 sittings. The buildings are fitted throughout with the electric light. The entire outlay upon the work has been about 8,500*l.*

WESLEYAN METHODIST CHAPEL, UPPER KNOWLE, BRISTOL.—The Wesleyan Methodist school-chapel at Upper Knowle, the memorial stones of which were laid recently, is being erected on a triangular-shaped piece of land at the junction of Redcatch-road and Wells-road. It is the first instalment of a scheme which includes a church with tower and spire, with accommodation for 700 persons, also lecture hall, vestries, etc. The present erection comprises a school-chapel, 50 ft. by an average of 40 ft., with transepts available for use as class-rooms; also an infant school, a church parlour (capable of division into two class-rooms), and four other class-rooms. There is also provision for tea meetings, library, lavatories, etc. The school-chapel will be seated for 350 adults, and will have an open roof and traceried windows with leaded lights. The ground floor rooms will be laid with wood blocks on cement concrete, supported by steel joists. The buildings are being erected in pennant stone with Bath stone dressings, and the roofs will be covered with red Broseley tiles. The premises will be warmed by hot water, and the total cost will be about 4,000*l.* The architects are Messrs. La Trobe and Weston, and the contractor Mr. C. A. Hayes.

SCHOOLS, BARRY.—At a special meeting of the Barry Education Committee, it was decided to recommend to the district council the purchase, at an estimated cost of 900*l.*, from the Holton Estate Company, of three-quarters of an acre of land, adjoining the present High-street schools, for school extension purposes, and the architect, Mr. G. A.



Plan of Brompton Hospital Sanatorium and Convalescent Home, Heatherside, Surrey.

Birkenhead, was instructed to prepare plans for a new girl's school, to accommodate 400 children, to be erected on this site; and for the erection of a new boys' school in Romilly-road, instead of a girls' school as previously intended, with a central hall, 52 ft. by 32 ft.

NEW SCHOOLS, LEYLAND, LANCASHIRE.—The new Balshaw's schools, at Leyland, were opened recently. The building provides four class-rooms, each capable of accommodating twenty-five pupils, making a total provision of 100 seats. The assembly hall has a parquet flooring, and there are separate cloak-rooms and playgrounds. The old school has been converted into a chemical and physical laboratory. The cost of the new building and the improvements effected at the old premises has been between 3,000*l.* and 4,000*l.* Mr. Catterall, architect, prepared the plans for the work.

SANATORIUM AND CONVALESCENT HOME, HEATHERSIDE.—This sanatorium, opened a few days ago, is in connexion with the Brompton Consumption Hospital. The want of a branch in the country to which convalescent patients could be sent had long been felt, especially since the development of the principle of open-air treatment of tuberculosis came prominently before the public. The site was chosen after careful inspection of a number of places in Surrey, Kent, Middlesex, and Buckinghamshire, the choice of the present site resulting from its conspicuous advantages in elevation, soil, and shelter, water supply, and accessibility. The sanatorium stands on the Chobham Ridges, Surrey, 400 ft. above sea-level, which border the large tract of unenclosed moorland belonging to the public, over which the War Office has acquired certain rights for military purposes. The sanatorium grounds face, for the most part, south, and command a fine view over Frimley Common, Farnborough, and Aldershot. Except on the south the grounds are surrounded by the pine woods of the Heatherside estate, of which they were a part. The soil is gravel and sand, belonging to the upper Bagshot series, and has a reputation for dryness. The sanatorium, which has taken two years to complete, is arranged as shown on the accompanying plan. A two-storied block of stellate form rises into three stories in the centre, for the reception of 100 patients. The central part includes the board and day-rooms, the matron's apartments, and pharmacy, and some of the larger wards, while the four radial pavilions contain the majority of the wards, which are principally single-bedded. These face S., S.S.W., and S.S.E., and are so arranged that no portion of the building is shaded by another. The height of the wards is 10 ft., and the cubic space per patient about 1,300 ft. There is a fire-escape staircase at the end of each pavilion, and further, two of the pavilions are cut off from the rest of the block by a corridor of fire-resisting construction with a glass roof. The wards are designed to have windows open day and night with protection from weather and glare, and the lower story is so arranged that patients in bed can be wheeled out on to the terrace, to be under the full influence of the sunshine and atmosphere. Open balconies are formed at the end of each pavilion, and, in addition, large rest shelters will be erected in the sanatorium grounds. Two detached sanitary towers on either side of the central building, and connected with it by gangways, contain the bathrooms, water-closets, lavatories, and housemaids' closets. A second group contains the two dining-rooms, and a large recreation-room, and behind there are the kitchen and offices, and on either side connected by covered ways, are the residence of the medical officers, and the home for nurses. At some distance from the sanatorium is the machinery block, containing the boilers and

engine-houses, the laundry, the electric plant, the mortuary, and the laboratory. The institution will be lighted by electricity, generated on the premises; electric motive power will be used in the laundry. The heating will be principally by hot water radiators. The water supply is from the Frimley water-works, which are at a short distance from the sanatorium, and the drainage is connected with the Frimley main drainage scheme. The architect is Mr. Edwin T. Hall, of London, and the contractors are Messrs. Holliday and Greenwood, also of London.

METHODIST CHURCH, SNEINTON, NOTTS.—The memorial stones of the new Methodist church at Sneinton, were laid recently. The building will comprise a chapel, 60 ft. long by 39 ft. wide, with a transept on either side. There will also be a choir, 24 ft. wide by 18 ft. deep. Seating accommodation will be provided for 450 persons. Underneath the chapel will be a hall, 42 ft. long by 39 ft. wide, and five extra class-rooms. The main entrance is to be from the corner of Sneinton-boulevard and Thurgarton-street, but two staircases are to be provided for the schoolroom. Two vestries, one on each floor, will also be furnished, these having a separate staircase. Both the chapel and school are to have a wood dado to a height of 4 ft. 6 in., and above this the walls will be colour-washed. Externally the work will be carried out in brick, with stone dressings. The builder is Mr. John Lewin, of Netherfield, and the architect Mr. W. H. Higginbottom, of Nottingham. The cost, it is roughly estimated, will be about 5,000*l.*

QUEEN VICTORIA MEMORIAL SCHOOL, DUNBLANE.—The plans for the proposed Victoria Memorial School for the Sons of Scottish Sailors and Soldiers have now been accepted by the committee, and will be put before the War Office for its approval, with a view to having the works started at the earliest possible date. A site near Dunblane has been secured for the school. The buildings it is proposed to erect include the administrative department, dining hall, kitchen, class-rooms, common hall, and dormitories in the main building. Separate houses are provided for the adjutant and headmaster. There are also to be a swimming bath, hospital, laundry, engine-house, and parade and play grounds. The buildings are to be lit by electricity. The completed scheme, accommodating 300 boys, is estimated to cost between 60,000*l.* and 70,000*l.*, and the plans have been so arranged as to admit of extension. In the plan a site is retained for a memorial chapel, but the cost of its erection is not included in the estimate, and the hope has been expressed that some private donor might provide the money for this part of the scheme. The architect is Mr. John Archibald Campbell, I.A., Glasgow.

HAGGERSTON PUBLIC BATHS.—The accommodation provided in these baths includes a large swimming bath, 100 ft. long, 35 ft. wide, and of a varying depth from 3 ft. 6 in. to 6 ft.; seventeen men's and five women's first-class, and forty-nine men's and nineteen women's second-class slipper baths; an entrance hall, 28 ft. by 16 ft., with a central ticket office; public cloak-rooms, a large swimmers' club room, a public laundry, fitted with sixty washing troughs and drying horses, and five hydro-extractors, mangling and waiting-rooms, a board-room, and, in the attic story, residential accommodation for the superintendent. The boiler-house, the heater-room, the establishment laundry, and the store-rooms are placed in the basement floor. In planning the swimming bath an attempt has been made to solve the problem of enabling a large body of spectators to obtain an entirely unobstructed view of the whole water area of the bath. The spectators' seats are in three stages, the lowest of which is placed about 18 in. above the level of the bath platform, the dressing-boxes, sixty-nine in number, being arranged immediately behind the top stage of the public seating, which is planned to accommodate about 300 persons. The engineering plant comprises three Lancashire boilers, 28 ft. long by 7 ft. in diameter, connected with the requisite feed and condense pumps, steam injectors, suction and delivery pipes, valves, etc.; a Green's patent fuel economiser, fitted with an electric motor for driving the scrapers, two large multitubular reservoir heaters, and electric motors for actuating the wash-house machinery and the ventilating fans. The general heating is effected by radiators placed in the various rooms and corridors, and connected with a low-pressure hot-water heating apparatus. The walls of the swimming-bath hall, the suites of slipper baths, the public and establishment laundries, and the public corridors and staircases are faced, and the bath tank lined, with enamelled bricks, supplied by the Farnley Iron Company. The arched roof principals of the swimming bath are of steel, encased in ribs of panelled plaster; the lower portions of the lantern light are of glazed terra-cotta, supplied by the Leeds Fireclay Company, fitted with iron casements, and the upper portions have fixed glass roofs and domes. The bath platforms are paved with patent interlocking rubber tiling, the gallery staging is of teak, and the enclosures of the slipper baths are formed with slabs of St. Anne's marble. Messrs. Killby and Gayford were the general contractors, and the constructional steel work has been supplied and fixed by Messrs. Homan and Rodgers. The engineering plant was installed by Messrs. Z. D. Berry and Son; Messrs. Hemmingway and Pritt carried out the electric lighting; the ornamental metal work was supplied by Messrs. Benham, Froud, and Thos. Elsley, Ltd., and the ship vane by Mr. George Wragge. The figures, in low relief, on the pediment of the main front were modelled by Mr. F. E. Schenk, and carved by Messrs. Martyn and Co. Externally, the buildings are faced with Lawrence's red bricks and Portland stone. Mr. H. Barton was the general foreman, Mr. F. C. Saunders the clerk of the works, and Mr. A. W. S. Cross, the architect. The total cost of the buildings was about 60,000*l.*

STAINED GLASS AND DECORATION.

NEW WINDOWS, EGERTON CHURCH, ASHFORD.—Messrs. Percy Bacon and Brothers, London, have just completed the east window at this church, having added two side lights of stained glass, the centre light having been put in some time ago. The figures are St. Mary, in the left, and St. John, in the other light, on either side of the Crucifixion, which is depicted in the centre light. They have also executed and fixed in the same church a memorial window to the late John and Maria Payn.

STAINED GLASS MEMORIAL WINDOW, ANCASTER, NOTTS.—A stained-glass memorial window, which has been placed in the north aisle of the parish church at Ancaster, was recently unveiled. The window contains three panels, and has been designed and executed by Messrs. Clayton and Bell, of London.

SANITARY AND ENGINEERING NEWS.

THE SANITARY CONDITION OF GLASGOW.—Mr. Peter Fyfe, chief Sanitary Inspector for Glasgow, in his annual report on the work of his department, says that the year 1903 marks the lowest death-rate in the history of Glasgow, being 18·405 per cent., against 20 and 21·2 for 1902 and 1901 respectively; 14,483 persons died last year, in place of 15,532 in 1902, in a population estimated by the Registrar-General at 11,460 more than then, his estimated population for Glasgow in 1904 being 798,357. Out of the 45,308 nuisances which were recorded in 1903, 13,545 were due to drains, soil pipes, and branches choked, etc. The work of closing unwholesome dwellings was greatly supplemented during the year by the energy displayed by the Sub-Committee on Back Lands and Uninhabitable Areas, as, through the representations of the Medical Officer of Health, under the Housing of the Working Classes Act, a large number of most insanitary buildings, mostly of the type known as "back lands," were condemned, and have been closed and removed. These operations have gradually reduced the number of "ticketed" houses to 19,145, in which during the year 49,172 inspections were made for the abatement of overcrowding. As the result of these, 3,758 houses were found overcrowded, or 7·64 per cent. For the previous year the percentage was 8·3, and in 1901 it was 12·7. A disquieting feature in connexion with the housing of the labouring classes in Glasgow is the growth of overcrowding in houses above the size of those at present known as "ticketed." An organised course of night visitations to houses over 2,000 cubic ft. was made during the year in suspected localities, with the rather startling result that out of the 1,345 dwellings inspected 157 were overcrowded, or 14·69 per cent. of the total. The work inaugurated in 1902 by the Magistrates in connexion with the better sanitation of licensed premises was continued in 1903. Practically the whole of them are now into line with the requirements of the licensing bench. In the matter of smoke prevention steady improvement continues to be made.

FOREIGN.

AUSTRALIA.—The late Mr. Alfred Felton, of Messrs. Felton, Grimwade, and Co., chemists, of Melbourne, left a will dated August, 1900, in which nearly the whole of his fortune, amounting to about 500,000*l.*, was given to the Art Gallery and the charitable institutions of Victoria. The portion of the income to be utilised for art purposes is to be employed in the purchase "of works of ancient or modern art, antiquities, or other works or objects of artistic or educational value, calculated to raise or improve the public taste." These works will be placed in the Melbourne Art Gallery. Mr. Felton has not hampered the committee with any stipulations as to the art purchases for the National Gallery, and the Melbourne Art Gallery is given leave to make selections from the deceased gentleman's magnificent collection of pictures and articles of virtu. Any selections or any purchases are to be labelled "The Felton Bequest."

GERMANY.—Dr. Walter Reichel has been elected professor of electricity in the Technical Schools, at Berlin.——New medical schools, to be called the Empress Frederic Schools, are to be built at Berlin, from the plans of Herr Ihne.——The new church at Pasing, near Munich, designed by Professor Hocheder, has been completed, at a cost of 125,000 francs.——The new Natural History Museum, at Munich, is to be erected on the island Kohlen, on the Isar.——A new theatre is to be built at Dresden.——The new technical schools for engineers, at Breslau, have been opened.——A theatre, suitable for operas and important representations, is to be built at Stuttgart, from the plans of Professor Littmann; later it is proposed to add to the building a smaller one, suitable for concerts, etc.——The architect, Herr Neher, has undertaken the building of the Museum for the Senckenberg Natural History Research Society, at Frankfort; this building is to form a continuation of the new Senckenbery library, designed by Herr von Hoven.——The theatre at Bielefeld designed by Herr Bernhard Sehring was opened on Easter Sunday.——The Church of St. John at Mannheim, the work of the architects Curjel and Moser, was consecrated on May 29.

AUSTRIA—The new Physiological Institution attached to the Vienna University, and designed by Herr Gottlieb Jaroschka, was opened on May 2.——The Roman Museum which is in course of construction at Vienna has been designed by the architects Ohmann and Kierstein, and is intended to contain the results of the excavations in Lower Austria.——A new Evangelical church is to be built at Aussig according to the designs of Herr Zeissig.——A second synagogue is to be built at Brünn.——Herr Hans Miksch, a well-known architect in Vienna, died suddenly last month at Dresden.

SWITZERLAND.—The architect Herr Karl Moser has been entrusted with the building of the new Art Gallery at Zurich.——The Evangelical church at Rorschach designed by Professor A. Müller is completed.——The church at Vitznau designed by Herr Reber has also been completed.

UNITED STATES.—Considerable interest is excited by the programme of the competition for the Carnegie Technical Schools at Pittsburgh. The competition is for the selection of an architect not of a design, and no limit of cost is named. Five firms have consented to take part in the competition for a fee of $1,000 each—viz., Messrs. Carrère and Hastings, Cass Gilbert, Howells and Stokes, G. B. Post (all of New York), and F. Miles, Day, and Brother (Philadelphia). Other architects will be admitted to compete on satisfying the committee that they have done work of sufficient importance and merit their acceptance as competitors. The intended site includes thirty-two acres of ground, more than twelve acres of which will be covered by buildings, in five groups. Designs are to be sent in by September 10.

MISCELLANEOUS.

THE SURVEYORS' INSTITUTION CONVERSAZIONE.—The annual conversazione of the Surveyors' Institution was held on Thursday evening last week at the Natural History Museum. The members and guests were received in the central hall by Mr. and Mrs. H. T. Steward, and the function was attended by a large company. During the evening the string band of the Royal Engineers performed an interesting selection of music, and glees and part songs were also sung during the evening. The excellent general arrangements for the comfort and entertainment of those present contributed much to the success of the gathering.

FRENCH STONE EXPORTS.—According to a report received by the Foreign Office from Mr. Consul Loftus on the trade and agriculture of the district of Cherbourg for the year 1903, there has lately been some uneasiness amongst the Cherbourg firms interested in the stone trade on account of German competition. The amount of stone exported from Cherbourg, however, showed a considerable increase for the year, being about 118,963 tons, as compared with 85,226 tons exported during 1902. This trade is still, and has been for some years past, one of the best paying in Cherbourg, and is certainly one of the principal industries of the town, bringing, as it does, a continual stream of small ships from the United Kingdom, which come to the port light, or in

ballast, expressly to load with this stone for road-making in the South of England. The stone is of a soft nature, though excellent for road-making, and is shipped to Poole, Shoreham, Newhaven, the Thames, Folkestone, Fareham, and numerous other ports on the south coast of England, all the carrying trade being done by British vessels. A harder quality of stone is quarried near Cherbourg, at Fermanville, and is shipped in small quantities from Dielette. The average cost is 6s. per ton of macadam, the stone being broken into 1½ in. and 2 in. cubes; larger sizes are cheaper, 2½ in. stone being 5s. 9d. per ton. The price in the United Kingdom is about 10s. 2d. to 10s. 6d. per ton in port, whilst the price per ton delivered on the roads paid by some county councils in the South of England was between 18s. and 18s. 6d. in 1903.

ENLARGEMENT OF THE PATENT OFFICE.—In view of a large increase of the technical staff, rendered necessary by the provisions of the Act of 1902, which, it is anticipated, will be put into active operation on January 1 next, the Commissioners of H.M.'s Office of Works have recently erected new buildings on the north side of Quality-court, Chancery-lane. The block affords accommodation for some forty members of the staff; it occupies the site of the last remaining portion of the old office, as designed by Sir William Chambers, with a Roman Doric order and pediment upon a rusticated base—his last executed work in London. Additional room for about 200 will be provided, in pursuance of an Act of last year, in a building, for which the plans are being prepared, on a site in Furnival-street, Holborn, adjoining the present office buildings in Staple Inn and Took's-court. The total cost of the new Patent Office is estimated to be 167,750*l.*, of which sum about 166,000*l.* has already been spent. The new Patent Office at Berlin will cost, it is computed, about 700,000*l.*

PHILIPPINES COMMERCIAL MUSEUM.—Great progress is reported in connexion with the Commercial Museum established at Manila in October, 1902. The aim of the Museum is to encourage the resources of the Philippine Archipelago, and to aid in the extension of its domestic and foreign trade relations. Its work consists of collecting and exhibiting the commercial products of the islands, both in a crude and manufactured form, procuring for the convenience of local importers and foreign exporters an extensive and well-selected exhibit of articles imported from foreign countries, and exhibiting Philippine products in foreign markets. Every article exhibited will be marked with its name, name of manufacturer and exhibitor, use, price, etc., and will be displayed to the best advantage. Exhibits should consist of articles which are useful in the various forms of agriculture as practised in the Philippines, in lumbering, mining, and road-making, builders' hardware, mechanics' tools, blacksmiths' tools, electrical appliances and supplies, engineers' and plumbers' stores and tools, paints and oils, office and household furniture, etc.

THE "SECURA" FLOOR SYSTEM.—The flooring to which this name is given consists of a flat arch construction built of hollow blocks, the principal feature in which is that the internal stays are arranged obliquely in the direction of the line of maximum pressure, so that no strain may be experienced likely to break the stays. The blocks are intended to be placed between the girders, and covered with a surface of cinder, or other concrete. This system, with the exception of the distinctive feature mentioned, is not materially different from numerous forms of hollow tile flooring already well known in this country. Its use has been confined hitherto chiefly to Germany, where it has been adopted with satisfactory results. In December last some trials were made of "Secura" floors in the new building of the Berlin Patent Office, by Professor Gary, of the Royal Testing Institution, at Gross-Lichterfelds. Load tests were made of one floor, and drop tests upon two others. In the former, the floor was loaded to five times the calculated load, with the result that, in a span of nearly 2 mètres, the deflection was only about 0·5 mm., and in the latter the floor was subjected to the impact of an iron ball weighing about 112 lb., falling from a maximum height of 6·5 mètres. Several attempts were made before the ball damaged the flooring, but even then it only made a funnel-shaped depression, and did not fall through. Although these results are somewhat indefinitely stated, they are sufficient to indicate that the floor system possesses considerable rigidity and strength.

INCORPORATED CHURCH BUILDING SOCIETY.—This Society held its usual monthly meeting on Thursday, the 16th inst., at the Society's House, 7, Dean's-yard, Westminster, the Hon. E. P. Thesiger, C.B., in the chair. Grants of money were made in aid of the following objects:—Building new churches at Callowland, Christ Church, near Watford, 200*l.*; Southend-on-Sea, St. Erkenwald, Essex, 120*l.* for the first portion; and Egremont, St. Columba, near Liverpool, 95*l.*, in lieu of a former grant of 80*l.* for the first portion; and towards enlarging or otherwise improving the accommodation in the churches at Ellerburne, St. Hilda, near Pickering, 10*l.*; Lakenheath, St. Mary, Suffolk, 40*l.*; and Wallingford, St. Peter, Berks, 40*l.* Grants were also made from the Special Mission Buildings Fund towards building mission churches at Eltham, St. John the Baptist, Kent, 25*l.*; Llansadwrn, Capel Dewi, Carmarthen, 25*l.*; and St. Ives, St. Nicholas, Cornwall, 50*l.* The following grants were also paid for works completed:—Loudwater, near High Wycombe, 50*l.*; Seighford, St. Chad, near Stafford, 15*l.*; Hemblington, All Saints, near Norwich, 30*l.*; Summerstown, St. Mary, Surrey, 250*l.*; Victoria Docks, Church of the Ascension (Felsted School Mission), Essex, 200*l.*; Alexandra Park, St. Saviour, Middlesex, 100*l.*; Astley, St. Peter, near Stourport, 30*l.*; Shirebrook, Holy Trinity, near Mansfield, 30*l.*; Primrose Hill, St. Matthew, near Huddersfield, 50*l.*; and Bensham, St. Hilda, near Gateshead-on-Tyne, 50*l.* In addition to this the sum of 58*l.* was paid towards the repairs of seven churches from trust funds held by the Society.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The Sixty-first Annual Congress of this Association will be held at Bath, from Monday, August 8, to Saturday the 13th, inclusive. Amongst places of archæological and historical interest, within reasonable distance, which will probably be visited, may be mentioned the following—viz., Wells (the Cathedral, Deanery, and Bishop's Palace); Glastonbury (the Abbey, Museum, and the early British village); Corsham (for Lacock Abbey); Malmesbury (the Abbey); Longleat (the seat of the Marquess of Bath); Calne; Hinton-Charterhouse (the remains of the Carthusian Priory); Norton St. Philip (the Church and XVth-Century Inn); Bradford-on-Avon (the ancient Saxon Church, the Bridge Chapel, and XIVth-Century Tithe-barn); Avebury (the stone circles and earthworks, and Silbury Hill); Caerwent (the ancient Roman station). One whole day, or parts of two days, will be devoted to the antiquities of Bath, and the more immediate neighbourhood, including the Abbey Church, the Roman Baths, St. John's Hospital, and the ancient earthworks on Hampton Down, and the traces of an ancient British village.

SOUTH-WESTERN POLYTECHNIC, CHELSEA.—The lectures on Architectural History, given during the past session by Mr. Banister Fletcher, have been attended by fifty-nine students, and at the examination, held at the conclusion of the course, fourteen students satisfied the examiner, Professor W. R. Lethaby. The names of the successful students are:—*Frank L. Atwell, Major Alsford, Herbert E. Bailly, *Kate Coast, Henry A. Buck, Charles Coxall, Sybil R. L. Gould, *Stephen S. Groom, Jessie A. C. Kosrelka, James H. Morton, *Minnie Thatcher, Lucio Velasco, William F. Wallace, Francis C. Welles. Those with an asterisk against their name received, in addition, a certificate of merit. The scheme of instruction consisted of weekly lectures (at which carefully-selected notes were given out), illustrated with lantern slides, and specially prepared large lecture diagrams, followed by sketching classes and further explanations of the styles under discussion, which were also rendered more easy to understand by large folio reference books for each style. The majority of students were architects' assistants, pupils, engineers, and art students; but a considerable number of students interested in architecture as a necessary part of education were present, especially those who are in the habit of travelling, or who are interested in historical development. For the coming session, which opens at the South-Western Polytechnic on Monday, October 3, at seven o'clock, a series of visits are being arranged to important buildings and museums around London, so that a student may be able to become acquainted with the actual details of architecture, which is impossible to be obtained in a lecture-room only.

CAPITAL AND LABOUR.

EMPLOYMENT IN THE BUILDING TRADES.—According to returns furnished by seventy-eight employers' associations, whose members are estimated to employ about 88,500 workpeople, and by trade unions with an aggregate membership of about 194,700, employment continues dull. Compared with a month ago it shows little change on the whole, but it is worse than a year ago. With bricklayers, employment is reported as dull generally, but slightly better than a month ago, and about the same as a year ago. With masons it was fair in England, and much the same as a month ago, but worse than a year ago; in Scotland it was dull, and showed no improvement compared with either a month or a year ago. With carpenters and joiners, employment was dull in England, and fair in Scotland. The percentage of unemployed trade union carpenters and joiners at the end of May was 5·9, compared with 6·1 at the end of April, and 2·6 in May, 1903. With plumbers, employment was dull. The percentage of unemployed trade union plumbers at the end of May was 9·2, compared with 9·7 at the end of April, and 6·4 a year ago. Employment with plasterers was dull generally. With painters in England it was, on the whole, moderate, and rather better than a month ago; in Scotland it was good and much the same as in April. With slaters and tilers it was dull in England and Ireland, but it was fairly good in Scotland.—*Labour Gazette.*

Legal.

EMPLOYERS' LIABILITY ACT:

QUESTION AS TO AN UNSAFE "SCAFFOLD."

At the Marylebone County Court on Friday last week, before Judge Stonor and a jury, Thomas Patrick Hill, builder's labourer, 8, Saltram-crescent, Paddington, W., sought to recover 150*l.* damages, under the Employers' Liability Act, against Mr. John McKenzie, builder and contractor, 1, Keslake-road, Kensal Rise, N.W. The plaintiff's claim was in respect of personal injuries, said to have been sustained owing to negligence on the part of the defendant or his foreman.

Mr. Chester Jones, counsel, appeared for the plaintiff; and Mr. W. Shakespeare, counsel for the defendant.

The plaintiff's case, briefly, was as follows:—In April of last year he was in the employ of the defendant, assisting in carrying out a job at the Zoological Gardens, Regent's Park. In order to reach some painting work outside the parrot house, plaintiff and another man, named Barry, required a ladder about 20 ft. long. The foreman told them to see if they could find a ladder of such a length on the job, and when they informed him that they were unable to find one, he replied, "Go on and do the best you can." They accordingly put boards upon a pair of trestles, and upon the boards they placed a pair of ordinary steps, the top leaning against the wall of the house. Barry stood upon the boards, holding the steps, while plaintiff mounted and worked from the steps. As plaintiff was leaning over to one side, the foot of the steps and the boards were suddenly forced outward from the wall, the whole "scaffold" collapsed, and the men fell to the ground. The plaintiff sustained a fractured thigh, and the other man also was injured. Both the defendant and the foreman saw them working upon the "scaffold."

In cross-examination, the plaintiff said that he was experienced in such work as that referred to, and that it was their duty to erect such small scaffolds for themselves. He was aware at the time that it was dangerous to work upon such a scaffold, but they took "all precautions." There were 30-ft. ladders on the job, but these were too long for the work.

Medical evidence having been given as to the plaintiff's injuries,

James Barry, the man who also fell, corroborated as to their failure to find a 20-ft. ladder on the job, and as to the foreman, on being so informed, saying, in effect, "You will have to get at it the best way you can." Witness also stated that the foreman saw them working upon the scaffold, and that both defendant and the foreman were only a little distance off and within sight at the time of the accident.

Mr. Robert Thomas Brown, surveyor, said that, in his opinion, the "scaffold" described was not a proper one, because the weight of the man upon the steps tended to force out the lower part.

In cross-examination, witness, after some hesitation, said that a man with forty years' experience in such work—as the plaintiff admitted he had—would be a fool to work on such a "scaffold."

The defendant denied having seen the two men working from the "scaffold," and stated emphatically that there were, at least, two 20-ft. ladders on the job which the men might have used.

William Thomas Gammon, the foreman on the job, stated that when the men asked for a ladder, shorter than the 30 ft. one, he told them that there was one at the monkey house. He denied having said, "Do the best you can." There were two 20-ft. and one 25-ft. ladders on the job which the men might have used. After the accident, he and another man got a 20-ft. ladder from quite near the

spot where the accident occurred, and finished the work which the two men had been doing. Witness also denied having seen the two men working upon the "scaffold"; no reasonable man would have worked in such an unsafe way.

Alfred Hawtin corroborated the last witness as to the finishing of the work, after the accident, with a lauder about 20 ft. in length. He had seen two ladders of about that same length on the job before the accident happened.

William Robert McKenzie, son of the defendant, said he knew, as a fact, that there was at least one ladder of about 20 ft. length on the job the day before the accident.

Henry Roberts, keeper of the elephants at the Zoological Gardens, stated that just before the accident occurred, he told the men several times that they would fall. Witness also said that he saw a ladder about 14 ft. or 15 ft. in length near where the men were working.

Further medical evidence having been given,

The jury found (1) that the defendant or his foreman did not see the plaintiff working in a dangerous manner; (2) that the defendant or his foreman were not guilty of negligence, under all the circumstances of the case, in regard to the supervision of the manner in which the men were working; (3) that the plaintiff was guilty of contributory negligence.

This was, of course, a verdict for the defendant, in whose favour his Honour gave judgment, and allowed costs.

ACTION AGAINST ARCHITECT AND ENGINEER.

THE case of Hodgson *v.* Waugh was mentioned to Mr. Justice Grantham in the King's Bench Division this week.

In this case the plaintiff, a merchant, sued the defendant, Mr. John Waugh, an architect and engineer practising in the West Riding of Yorkshire, to recover damages for alleged negligence. Plaintiff's case is that he instructed the defendant to alter a house he had bought in Hertfordshire, that defendant had not followed out his instructions with regard to the alterations made in the house, and that, as a consequence, the plaintiff had been put to great expense, which he claimed from the defendant as damages. The defendant counterclaimed for architect's fees and commission.

On November 9 last the case came before the Court of Appeal (reported in the *Builder* of November 14, 1903) on the appeal of the plaintiff from an order of Mr. Justice Ridley in Chambers, reversing an order of the Master, and directing that the case should be tried at the Leeds Assizes before a jury, the Master having directed that the case should be referred to an official referee. On this appeal the parties agreed that the action should be set down in Middlesex, to be tried before a special jury, and an application was to be made to the Senior Judge of the King's Bench Division for him to decide how the figures in the case should be dealt with. Hence the present application.

After some discussion Mr. Justice Grantham said that the action should be tried before a special jury when the details as to figures could be disposed of.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

11,586 of 1903.—G. E. SHERWIN: *Appliances for Heating Water, and other Liquids.*

This consists in the use of a small tube within a larger tube for conducting steam to the opposite end of the larger tube to that from which escapes the water resulting from condensation of the steam, the tubes being secured by joints at one end only.

13,595 of 1903.—W. THOMSON: *Water Supply Regulators.*

Appliances for regulating the supply of water from pressure mains, embodying essentially a tube, open at one end and perforated at or near its other end, fitted with a regulating spring or a weight, and closing or restricting the outlet aperture or apertures by the action of the pressure water on it.

14,433 of 1903.—G. BAILEY: *Apparatus relating to Hot-water Supply for Baths, and other like purposes.*

In a kitchen boiler, or apparatus, used for heating water for baths, and other like purposes, the combination of a supply pipe controlled by a stop-cock, a hot water outflow pipe controlled by a three-way (or other branch) diverting cock, or an arrangement of branch pipes, one of which has an open end, the other terminating with or without a controlling cock, for supplying said baths or other receptacles for hot water.

16,186 of 1903.—J. S. PULLAN and W. H. MANN: *Machines for Moulding Firebricks, and the like.*

In brick-moulding machines, the employment of an adjustable base bracket at each side of the clay cylinder in combination with a sliding mould formed with two sets of mould recesses, located at such a distance apart that when one set of recesses is below the opening of the clay cylinder the other set of recesses is outside one of the base brackets, together with the mould bases.

16,853 of 1903.—Dr. CARL FREIHERR AUER VON WELSBACH: *Manufacture of Metallic Alloys having Pyrophoric Action, and their Application to the Purposes of Ignition and Illumination.*

The manufacture of metallic alloys composed of one or more rare earths to which iron is added, for producing an alloy having a high degree of pyrophoric action, so that, by the abrasion or concussion of the alloy, sparking of considerable intensity is produced.

25,001 of 1903.—W. OMIT, T. OMIT, and W. OMIT: *Kitchen Ranges.*

This consists of a rising bottom, working upon two eccentrics, cast on the sides of the bottom at back, and raised by means of the pendent plate in front thereof, operated by a lever. It also consists of two side plates, cast with bracket and socket, within which the two eccentrics work, and also with slips to hold the pendent plate and plate behind, both forming part of the cold air excluder.

1,924 of 1904.—W. RICHARDSON: *Cover for Trenches Used to Contain Heating Pipes, and the like, in Buildings.*

A pipe trench covering for use in schools, halls, or other public buildings, in the form of a tray or trough, made of cast-iron or other suitable material, in connexion with which troughing, vertical hot-air ducts, or tubes may be arranged with grating or other form of air escape covering on top, so as to allow the hot air from the trench below to rise freely into the room in any convenient position as may be required.

9,471 of 1904.—E. J. FULGHUM: *Floor Boards.*

This invention has for its object to obviate the loss incurred by short length floor boards, and consists of a floor board, comprising a plurality of short floor-board sections joined together at their transverse ends by binding interlocking joints, whereby they are adapted to resist longitudinal separation and produce a rigid board, said board having its sides tongued and grooved.

1,779 of 1903.—E. KERRY and E. C. KERRY: *Guard for Cellar Flaps or Pavement Lights, or for Opening any Path or Floor.*

A guard of wood or metal is made to fit and run in grooved or tongued runners, and is suspended by weights and cords in such manner that, on opening the flap, the guard rises automatically to a sufficient height to prevent any person passing from falling into the opening. Grooved or tongued runners, either of wood, iron, or other material, are fixed in an upright position, and extend from underside of pavement light or flap to the floor below, the grooves or tongues facing each other. A frame of iron, wood, or other suitable material is made so as to slide freely up and down between the grooves, or upon the tongues. This frame is of sufficient height to enable a suitable portion to stand up above level of pavement or floor, whilst its lower portion is held in position by the grooves in the runners or slides. Cords or wire ropes are fixed to the lower portion of frame, and pass upwards and over pulleys or wheels and downwards again. These are connected to a weight or weights, which are heavier than the frame, so that, on any person lifting the flap, the frame immediately rises to its required height and is held in position by the weight or weights before referred to. A catch is also arranged in the frame, which, when the proper height is reached, will catch on floor or pavement and prevent the frame being pushed down.

23,649 of 1903.—L. C. MULLGARDT: *Construction of Floors.*

In a concrete flooring in combination, a plurality of concrete panels located by metal framework, lengths of woven wire held in suspension by and sagging between adjacent parts of the framework, and incorporated in a plurality of such panels, and serving to unite them as interdependent suspension panels, and woven wire held in suspension by, and sagging between, adjacent parts of the woven wire lengths, uniting said plurality of panels and incorporated in the relative adjacent panels of said plurality and in the respective intermediate end concrete casings of the framework.

11,966 of 1903.—S. VOSS: *Device for Lifting and Setting Coping, and like Building Blocks.*

In a crane, the combination of a vertical mast, a scaffolding for guiding this mast, said scaffolding consisting of vertical posts connected by a horizontal beam and ropes fixed to the vertical posts, and running over rollers fixed to the mast.

9,135 of 1904.—G. BROECKEL: *Partitions or Plaster Structures for Buildings.*

A method of constructing partitions, girder casings, and the like, in which binding wires are employed for keeping the plaster support in position, the distinguishing feature being the stretching of a wire frame in the hooks driven in independently of one another in the different planes, to which frame the mortar support is fixed, and then the second frame fixed, the tension in both ribs being produced by driving the hooks in deeper.

9,539 of 1904.—P. HART: *Rock or Ore Crushers.*

In a rock or ore crusher, the combination of a shaft, a ball or sphere loosely fitted on the upper extremity of said shaft, a spider, shaped internally to receive the lower portion of the sphere, and a gland adjustably fitted to the tripod or spider, and shaped internally to fit the upper portion of the sphere, and means for introducing lubricant between the sphere and socket and the sphere and shaft.

9,569 of 1904.—W. R. PRYKE and W. PALMER: *Eaves Gutters.*

This consists in the addition of ribs, fillets, studs, or projections, of any kind on the outer back surface or wall face of eaves gutters, whether of the O-G, or other form, so that the eaves gutters not only stand out from the wall, and are set in determined positions, but also from the shape at which the ribs, fillets, studs, or projections, are arranged, said gutters become more effective, and prevent the usual front edge overflow in times of heavy rain.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

TO CORRESPONDENTS.

R. L. M. (Below our limit).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, manuscripts, or other documents, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

June 10.—By MAY & ROWDEN.

New Bond-street.—No. 151, also 2, Little Bruton-st. (shop and workshops), Corporation lease, g.r. 10*l.* 10s., fine nil, p.	£20,000
Regent-street.—53 and 54, King-st. (warehouse and showrooms), area 2,900 ft., u.t. 15 yrs., g.r., etc., 79*l.*, y.r. 735*l.* 1s.	8,250
Piccadilly.—128, Jermyn-st. (s.), u.t. 11½ yrs., g.r. 42*l.*, y.r. 130*l.*	600
Kingsland.—Wilmer-gdns., f.g.r. 60*l.*, reversion in 33 yrs.	1,475

By NICHOLAS, DENYER, & Co.

Maidstone, Kent.—"Willington-ct.," and 1 acre, f., y.r. 80*l.*	1,400

By NOKES & NOKES.

Forest Hill.—18, Wynell-rd., u.t. 59 yrs., g.r. 7*l.* 10s., e.r. 40*l.*	280

By SALTER, REX, & Co.

Kentish Town.—19 to 37 (odd), Highgate-rd., f., y.r. 596*l.*	8,100

By W. G. SHADRAKE.

Forest Gate.—10, Knighton-rd., u.t. 94 yrs., g.r. 4*l.*, p.	290

By WINDRUM & CLEAVE.

Poplar.—39, 41, and 43, St. Leonards-st., u.t. 49 yrs., g.r. 12*l.*, w.r. 96*l.* 4s.	575
Millwall.—16 and 18, Cuba-st., f., w.r. 59*l.* 16s.	520
Canning Town.—2, Newton-st., f., w.r. 15*l.* 12s.	130
Limehouse.—13, Stainsby-rd., f., e.r. 65*l.*	850

June 2.—By WALTON & LEE (at Cambridge).

Great Chester, Cambs.—"Byron Lodge" and 0 a. 1 r. 8 p., f.p.	1,000

June 3.—By WALTON & LEE (at Chippenham).
Chippenham, Wilts.—Part of Quarry Ground, 16 a. 3 r. 20 p., f. £400
Freehold Allotments, 19 a. 3 r. 26 p. 800
Upper Ladyfield, 19 a. 3 r. 3 p., f. 750
"Hungerdown Cottage" and 3 a. 0 r. 14 p., f.p. 200

June 4.—By ELWORTHY & SON (at Wisbech).
Wisbech St. Mary, Cambs.—Two freehold and copyhold farms, 111 a. 0 r. 31 p. 4,600
Enclosures of land, 15 a. 0 r. 4 p., f. and c. 610

June 7.—By WALTON & LEE (at Sandown).
Sandown, Isle of Wight.—1 to 5, Broadway-cottages, u.t. 966 yrs., g.r. 7*l.* 10*s.*, y.r. 63*l.* 850
3 to 10, Grove-rd., u.t. 992 yrs., g.r. 16*l.*, y.r. 150*l.* 2,230
Station-av., builder's, wheelwright's and carpenter's shops, u.t. 954 yrs., g.r. 1*l.* 10*s.*, y.r. 29*l.* 14*s.* 230

By JOSEPH STOWER (at Plymouth).
Little Hempston, etc., Devon.—The Bolton Estate, comprising freehold farms, lands, etc., 3,281 a. 1 r. 16 p. (in eight lots) 62,370
St. Martin-by-Looe, Cornwall. — Freehold farms, lands, etc., 802 a. 1 r. 0 p. (in five lots) 15,245

June 8.—By JOHN HATCH (at Southport).
Southport, Lancs.—Lord-st., "Pavilion Buildings" (shops) and plot of land, area 1,107 yds., f. 16,500

By SALTER, SIMPSON & SONS (at Attleborough).
Griston, Norfolk.—"Hipkins Farm," 47 a. 1 r. 29 p., f. and c. 625
A copyhold enclosure, 7 a. 2 r. 4 p. 120
Caston, Norfolk.—Enclosure with plantation, 7 a. 1 r. 6 p. 225
Besthorpe, Norfolk.—A freehold farm, 165 a. 3 r. 16 p. 2,950
Shropham, Norfolk.—A freehold holding, 2 a. 1 r. 1 p. 100

June 9.—By JOSEPH STOWER (at Penzance).
Ludgvan, etc., Cornwall.—The Bolton Estate, comprising freehold farms, lands, etc., 2,710 a. 2 r. 37 p., including the "Advowson of Ludgvan" and the "Manor of Ludgvan Leaze" (in numerous lots) .. 73,665
"The Star Inn" and 0 a. 2 r. 32 p., f. 1,225
"The Old Inn" and 0 a. 1 r. 17 p., f. 750
Towednack, Cornwall.—The lordship of the Manor of Porthia (otherwise St. Ives), with its rights, etc. 380

By RAWLINS & CO. (at Croydon).
Sanderstead, Surrey. — Sanderstead-rd., etc., seven freehold building sites (in lots) 1,555

By ALEXANDER MOSSMAN (at Uxbridge).
Hayes, Middx.—West End, an enclosure of freehold building land, 2 a. 2 r. 3 p. 600

By FOX & VERGETTE (at Crowland).
Crowland, Lincs.—Various enclosures, 71 a. 0 r. 4 p., f. 3,525
Various enclosures, 26 a. 0 r. 0 p., f. 1,260
A freehold wash-meadow, 12 a. 3 r. 10 p. .. 640

June 10.—By FRANKLIN & JONES (at Wallingford).
Ewelme, etc., Oxon.—"Day's" and "Warren's" farms, 339 a. 3 r. 17 p., f. 2,000
Six freehold cottages, y.r. 19*l.* 5*s.* 215
Benson-on-Thames, Oxon.—High-st., "Mulberry Cottage," f., p. 575
High-st., freehold house and shop, y.r. 20*l.* . 440
Four freehold cottages, y.r. 22*l.* 8*s.* 255

By D. ROBERTS & SON (at Corwen).
Llangwm, Denbigh.—Two freehold farms, 125 a. 3 r. 8 p., y.r. 91*l.* 2,500
Five enclosures of land, 3 a. 3 r. 19 p., f. .. 275
Llanfihangel, Denbigh. — Three enclosures, 3 a. 2 r. 4 p., f. 110
Cerrigydruidion, Denbigh. — Three freehold farms, 359 a. 3 r. 39 p. 2,800

By JOSEPH STOWER (at St. Ives).
St. Ives, Cornwall.—"Barnoon House" and 0 a. 0 r. 25 p., f., y.r. 51*l.* 5*s.* 1,510
Fore-st. (s.), and tenement, f., y.r. 7*l.* 10*s.* .. 190
Bunker's-hill, four cottages and premises, f. 220
Island-rd., etc., seventeen plots of land, with buildings and erections thereon, also the Island Wastrel 720

By G. B. HILLIARD & SON (at Chelmsford).
Rettendon, Essex.—"Bourne's Farm," 26 a. 0 r. 17 p., c. 250
Four freehold enclosures, 17 a. 3 r. 36 p. .. 180
East Hanningfield, Essex.—"Neville's" or "Sewell's" farm, 13 a. 2 r. 15 p., f. 170
"Licey's" or "Lacey's" farm, 29 a. 1 r. 27 p., f. 500
"French's" farm, 83 a. 1 r. 24 p., f. 1,400

June 11.—ELWORTHY & SON (at Wisbech).
Wisbech St. Mary, Cambs.—"Inham Hall Farm," 125 a. 0 r. 5 p., f. 5,650
Old pasture land, 5 a. 0 r. 3 p., f. 525
Emneth, Norfolk.—Two enclosures of land, 17 a. 0 r. 36 p., f. and c. 500

By STAFFORD & ROGERS (at Bedford).
Wilstead, Beds.—"Town Close," 3 a. 3 r. 35 p., f. 165
Freehold cottage and pightle, 1 a. 1 r. 31 p. 100
"Sanfoin's Enclosure," 14 a. 1 r. 27 p., f.. 210

June 13.—BRODIE, TIMBS & CO.
Highgate.—Fitzroy Park, "The Limes," beneficial lease for twelve yrs., head rent 65*l.*, with p. 300

HILLIER & PARKER.
Regent Street.—8, Foubert's-pl., f., y.r. 97*l.* 10*s.* 2,130

ROBINS & HINE.
Battersea.—25, Lavender-ter., and stabling, u.t. 33½ yrs., g.r. 3*l.* 1*s.*, w.r. 33*l.* 16*s.*.. 255

ALFRED SAVILL & SON.
Bilsington, etc., Kent. — "Rowland-st.," "Lower," and "Noakes" farms, 233 a. 1 r. 2 p., including the "Manor of Westbury" (in lots) 2,922

ALEX. H. TURNER & CO.
Godstone, Surrey.—"Alwinton" and 4 acres, f., p. 3,150

WM. WILLETT.
Hampstead.—4, Williams-mews, u.t. 60 yrs., g.r. 10*l.*, y.r. 65*l.* £740

June 14.—ARTHUR BLACKFORD.
Marylebone.—34, Great Barlow-st., with yard and stabling, u.t. 18 yrs., g.r. 2*l.* 13*s.*, y.r. 149*l.* 6*s.* 630

DAVID BURNETT & CO.
Pulham St. Mary Magdalen, Norfolk. — "Semere Green Farm," 18 a. 3 r. 27 p., f., y.r. 22*l.* 10*s.* 460

CHAMPION & BUSBY.
Leytonstone.—11, Beulah-rd., f., w.r. 22*l.* 2*s.*.. 215

EDWIN EVANS.
Kingston Hill, Surrey.—"Sussex Lodge," f.g.r. 20*l.*, reversion in 44¼ yrs. 760
Mortlake. — Sheen-la., f.g.r. 25*l.*, reversion in 39½ yrs. 900
Putney.—Charlwood-rd., f.g. rents 73*l.* 10*s.*, reversions in 46 to 51¼ yrs. 2,279
Charlwood-rd., f.g. rents 26*l.* 3*s.* 4*d.*, reversions in 17¼ and 19½ yrs. 1,370
Stepney.—Whitehorse-st., etc., f.g.r. 14*l.* 14*s.*, reversion in 53 yrs. 440
Fulham.—Cassidy-rd., f.g. rents 47*l.* 5*s.*, reversion in 83½ yrs. 1,080
Ealing.—Lavington-rd., etc., f.g. rents 139*l.* 13*s.*, reversion in 97 yrs. 3,550
Norwood.—2 and 6, St. Mary's-rd., u.t. 59 yrs., g.r. 15*l.*, y.r. 70*l.* 240
Hanwell.—3, 4, and 5, Evelyn-ter., u.t. 99 yrs., g.r. 15*l.* 15*s.*, y.r. 88*l.* 600
Canning Town.—105 to 115 (odd), Bidder-st., and 1, Randall-st., u.t. 82 yrs., g.r. 38*l.* 10*s.*, w.r. 159*l.* 18*s.* 1,250
Holloway.—7, 9, 11 to 17, Brand-st., and 1 to 6, Brand-ct., u.t. 41¼ yrs., g.r. 70*l.*, w.r. 172*l.* 8*s.* 3,100
Deptford.—56 to 66 (even), 69, 71, and 73, Alvar-st., u.t. 47½ yrs., g.r. 43*l.* 7*s.*, w.r. 152*l.* 2*s.* 100
1 to 5, Dugald-st., and 1 to 6, Hamar-pl., u.t. 47½ yrs., g.r. 52*l.*, w.r. 185*l.* 18*s.*..... 110

By FRASER & HEIGH.
Holloway.—6, 12, 18, 20, 22, 24, and 28, Fulbrook-rd., u.t. 52 yrs., g.r. 31*l.* 2*s.*, y.r. 294*l.* 3,205
25, 27, 31, and 33, Langdon-rd., f., y.r. 144*l.* 2,035

By W. HALLETT & CO.
Maida Hill.—13, Blomfield-rd., u.t. 34 yrs., g.r. 14*l.*, y.r. 120*l.* 1,350
Acton.—20, Alfred-rd., u.t. 72½ yrs., g.r. 9*l.*, y. 500

By HARDING & SON.
Chelsea.—2 and 4, Park-walk (s.), u.t. 43 yrs., g.r. 16*l.*, y.r. 120*l.* 1,450
Fulham.—4, Rectory-rd. (s.), u.t. 33½ yrs., g.r. nil, w.r. 20*l.* 16*s.* 250

By E. H. HENRY.
Clapham.—16, Crescent-gr., also stabling in rear, f., y.r. 95*l.* 1,000
11, Grove-rd., f., y.r. 80*l.* 1,200
24, Victoria-rd., f., y.r. 50*l.* 700
31 and 55, Leppoc-rd., u.t. 76 yrs., g.r. 13*l.* 6*s.*, y.r. 80*l.* 850

By J. HIBBARD & SONS.
Bethnal Green.—90 to 100 (even), Cheshire-st., 53 to 71 (odd), Seabright-st., w.r. 560*l.*; also i.g. rents 310*l.*, u.t. 14 yrs., g.r. 93*l.* 2,800

By E. & H. LUMLEY.
Fulham.—1 and 2, Brind-ter., f., w.r. 35*l.* 2*s.* 285
Canning Town.—30 and 32, Nelson-st., f., w.r. 41*l.* 12*s.* 255
2, Emily-st., f., w.r. 18*l.* 4*s.* 118
35 to 41 (odd), Wightman-st., f., w.r. 109*l.* 4*s.* 595
East Ham.—1 to 9 (odd) Poulett-rd., u.t. 94½ yrs., g.r. 21*l.*, w.r. 127*l.* 620
Canning Town.—5 to 8, St. John's-rd., u.t. 79 yrs., g.r. 16*l.* 16*s.*, w.r. 92*l.* 6*s.* 100

By NORFOLK & PRIOR.
Catford.—Ravensbourne Park, "Old House" and 2 a. 1 r. 5 p., f., p. 1,400

By FRANKLIN & JONES (at Thame).
Shabbington, Bucks.—A freehold estate, 58 a. 2 r. 12 p. 2 800

June 15.—By H. DONALDSON & SONS.
Hoxton.—8, Cropley-st. (s.), u.t. 38 yrs., g.r. 3*l.* 15*s.*, y.r. 30*l.* 240
Dalston.—102, Richmond-rd., u.t. 19 yrs., g.r. 6*l.*, e.r. 36*l.* 180
23, Montague-rd., u.t. 56 yrs., g.r. 6*l.*, y.r. 34*l.* 315
87, Greenwood-rd., u.t. 48 yrs., g.r. 7*l.*, y.r. 42*l.* 350
Kingsland.—7, Ridley-rd., u.t. 52 yrs., g.r. 6*l.*, e.r. 45*l.* 385

By FOSTER & CRANFIELD.
Islington.—17, Popham-rd. (s.), f., y.r. 28*l.* .. 390
Holloway.—72, Drayton-pk., u.t. 71½ yrs., g.r. 8*l.*, y.r. 47*l.* 450

By W. T. MARSH.
West Kensington.—Beaumont-rd., f.g. rents 80*l.*, reversion in 74 and 77 yrs. 2,000
Notting Hill.—Appleford-rd., f.g. rents 49*l.* 10*s.*, reversion in 62½ yrs. 1,130
Clapham.—Klea-av., f.g. rents 47*l.* 5*s.*, reversion in 80 yrs. 1,141

By MARTIN, WHITE, & CO.
Dulwich.—12, Tarbert-rd., u.t. 76 yrs., g.r. 6*l.* 6*s.*, y.r. 34*l.* 320
14, East Dulwich-gr., u.t. 79½ yrs., g.r. 6*l.* 10*s.*, y.r. 32*l.* 315

By H. MUSKETT & CO.
Enfield Highway, Middx.—1 to 8, Market-parade, f., y.r. 425*l.* (in lots) 6,040
Clapton.—189, Brooke-rd., u.t. 71 yrs., g.r. 7*l.*, y.r. 38*l.* 455
Edmonton.—23 to 31 (odd), Millbrook-rd., u.t. 89 yrs., g.r. 20*l.*, w.r. 117*l.* 460

By NOTLEY & CO.
Soho.—13 and 15, Wardour-st. (s.), area 2,220 ft., f., e.r. and y.r. 600*l.* 1,150

By DOUGLAS YOUNG & CO.
Clapham.—30, Lynette-av., u.t. 80½ yrs., g.r. 7*l.* 10*s.*, y.r. 40*l.* 450
5 and 7, Klea-av., u.t. 80½ yrs., g.r. 13*l.* 10*s.*, y.r. 76*l.* 820

By TOPLIS & HARDING.
Chalk Park.—25 and 27, Belmont-st., u.t. 59 yrs., g.r. 12*l.* 12*s.*, y.r. 76*l.* £690
Holloway.—19, Anatola-rd., u.t. 64½ yrs., g.r. 6*l.*, w.r. 33*l.* 16*s.* 190
Kentish Town.—29a, Herbert-st. (yard and stabling), u.t. 61½ yrs., g.r. 3*s.*, y.r. 26*l.* 370

June 16.—CARTWRIGHT & ETCHES.
Wimbledon.—35, South Park-rd., f., e.r. 60*l.* 400

DEYSDALE, NURSE, & CO.
Stoke Newington.—40, Leswin-rd., u.t. 79 yrs., g.r. 6*l.*, w.r. 44*l.* 4*s.* 355
Kingsland.—Glebe-rd., warehouse premises, u.t. 33 yrs., g.r. 12*l.*, e.r. 50*l.* 250

FURBERS'.
Loudwater, Bucks.—"Riversleigh" and 1 a. 1 r. 5 p., f., p. 1,250

E. W. HARRIS.
Beckenham.—Arthur-rd., four freehold building plots 170
Sydenham.—41, Kent House-rd., u.t. 59 yrs., g.r. 8*l.*, e.r. 35*l.* 155

C. C. & T. MOORE.
Mile End.—232, 234, and 236, Devonshire-st., u.t. 6¾ and 19½ yrs., g.r. 19*l.*, w.r. 126*l.* 2*s.* 290
62, 65, and 66, Longfellow-rd., u.t. 56 yrs., g.r. 10*l.* 10*s.*, w.r. 92*l.* 6*s.* 500
Hackney.—50, Devonshire-rd., u.t. 62 yrs., g.r. 5*l.* 10*s.*, e.r. 40*l.* 250
Upton Park. — 28, Claughton-rd., f., y.r. 24*l.* 14*s.* 210
Leytonstone.—12 to 22 (even), Harvey-rd., f., w.r. 158*l.* 12*s.* 1,445
Carlton-rd. etc., f.g.r. 46*l.*, reversion in 97 yrs. 1,060
Woodford.—Eastwood-rd., f.g. rents 27*l.*, reversion in 97 yrs. 625
Poplar.—2, 3, 4, 5, and 6, Morris-rd., f., w.r. 140*l.* 8*s.* 1,150
Stepney.—32, 64, 68 to 74 (even), Ben Jonson-rd., and 1, Taylor's-pl., u.t. 18½ yrs., g.r. 20*l.*, y.r. 223*l.* 12*s.* 630
4, Monteagle-st., u.t. 79 yrs., g.r. 4*l.* 4*s.*, w.r. 27*l.* 6*s.* 275

By NEWBON, EDWARDS, & SHEPHARD.
Hampstead.—29, Cotleigh-rd., u.t. 82½ yrs., g.r. 8*l.*, e.r. 45*l.* 380
Canonbury.—25, Canonbury-rd., u.t. 14½ yrs. g.r. 5*l.*, e.r. 40*l.* 200
Finsbury Park.—54, Queen's-rd., u.t. 71½ yrs., g.r. 9*l.* 9*s.*, e.r. 65*l.* 695
Stoke Newington.—132, Osbaldeston-rd., u.t. 83½ yrs., g.r. 6*l.*, e.r. 55*l.* 565
Homerton.—34, 36, 42, and 44, Templar-rd., f., w.r. 93*l.* 12*s.* 265
Hackney.—193, Well-st. (s.), f., y.r. 18*l.* 360
Tottenham.—Broad-la., f.g.r. 5*l.*, reversion in 82 yrs. 130

By WM. STEVENS.
Dalston.—13 to 19 (odd), Ivydene-rd., u.t. 78½ yrs., g.r. 24*l.*, w.r. 171*l.* 12*s.* 1,350
33 to 39 (odd), Trederwen-rd, u.t. 78½ yrs., g.r. 20*l.*, w.r. 172*l.* 18*s.* 1,100
28, 30, 34, 36, and 38, Trederwen-rd, u.t. 80½ yrs., g.r. 25*l.*, w.r. 214*l.* 10*s.* 1,530
Hackney.—158 and 160, Lansdowne-rd., u.t. 78½ yrs., g.r. 15*l.*, y.r. 112*l.* 14*s.* 970
166, Lansdowne-rd. (s.), u.t. 78½ yrs., g.r. 1*l.*, w.r. 26*l.* 180
Dalston.—32 and 34, Lenthal-rd., u.t. 16 yrs., g.r. 2*l.*, y.r. 60*l.* 310
Stoke Newington.—31 and 33, Farleigh-rd., u.t. 60 yrs., g.r. 12*l.*, y.r. 78*l.* 900
De Beauvoir Town.—40, Culford-rd., u.t. 27½ yrs., g.r. 4*l.* 7*s.* 6*d.*, y.r. 30*l.* 260
215, Southgate-rd., u.t. 25 yrs., g.r. 6*l.* 10*s.*, p. 380
Stamford Hill.—2, Nassau-rd., u.t. 70 yrs., g.r. 8*l.*, y.r. 40*l.* 400
Holloway.—41, Corinne-rd., u.t. 64 yrs., g.r. 6*l.*, y.r. 36*l.* 410

By STIMSON & SONS.
Balham.—97, 103 to 109 (odd), Bedford-hill, u.t. 61 yrs., g.r. 50*l.*, y.r. 229*l.* 1,525
Bermondsey.—13 to 25 (odd), Cranham-rd., u.t. 51 yrs., g.r. 13*l.*, w.r. 240*l.* 10*s.* 1,830
80 to 86 (even), Rolls-rd., w.r. 135*l.* 4*s.*; also i.g.r. 9*l.*, u.t. 29½ yrs., g.r. 15*l.* 900
Old Kent-road.—5, Bowles-rd., u.t. 38 yrs., g.r. 4*l.*, w.r. 32*l.* 10*s.* 180
10 to 28 (even), Malt-st., u.t. 34½ yrs., g.r. 1*s.*, w.r. 293*l.* 16*s.* 2,320
Peckham.—3, 5, 7, and 9, Hill-st., u.t. 37½ yrs., g.r. 18*l.*, w.r. 130*l.* 880
21, Studholme-st., u.t. 70½ yrs., g.r. 5*l.* 5*s.*, y.r. 30*l.* 330
77 and 79, Naylor-rd., u.t. 70½ yrs., g.r. 10*l.* 10*s.*, w.r. 75*l.* 8*s.* 630
Battersea.—22 to 28 (even), Wayford-st., u.t. 71½ yrs., g.r. 20*l.*, w.r. 156*l.* 900
Croydon.—32, Westbury-rd., u.t. 65 yrs., g.r. 4*l.* 15*s.*, e.r. 30*l.* 315

By G. TROLLOPE & SONS.
South Kensington.—101, Onslow-sq., u.t. 33½ yrs., g.r. 2*l.*, p. 2,920

By G. B. HILLIARD & SON (at Rochford).
Great Stambridge, Essex.—"Steward's Elm Farm," 139 a. 2 r. 23 p., f., y.r. 120*l.* .. 1,900
Freehold messuage, shop and bakehouse, y.r. 19*l.* 300

June 17.—ARMY & NAVY AUXILIARY.
Paddington.—Lancefield-st., f.g. rents 59*l.* 10*s.*, reversion in 72 and 73 yrs. 1,450
Lingfield, Surrey.—Dorman's Park, "South View," f., p. 400

By BISLEY & SONS.
Rotherhithe.—74 and 76, Rotherhithe New-rd., u.t. 48½ yrs., g.r. 5*l.*, w.r. 62*l.* 8*s.* .. 500
115 and 117, Rotherhithe New-rd., u.t. 59 yrs., g.r. 5*l.* 5*s.*, w.r. 62*l.* 8*s.* 500
106, 108, and 110, Neptune-st., f., w.r. 58*l.* 10*s.* 525

COOPER & GOULDING.
Bow.—17 and 19, British-st., f., y.r. 67*l.* 1,070
Tottenham.—76, 78, and 80, Birkbeck-rd., f., w.r. 81*l.* 18*s.* 845
Maida Vale.—38, Sutherland-av., u.t. 59 yrs., g.r. 10*l.*, y.r. 70*l.* 420
Holloway.—1, 3, 5, 7, 9, 10, and 16, Foxham-rd., u.t. 70¼ yrs., g.r. 47*l.*, y.r. 320*l.* 3,060

CRONKS'.

Brockley.—5 and 7, Carlton-rd., u.t. 68½ yrs., g.r. 16*l.*, y.r. 100*l.*	£1,000
Sevenoaks, Kent. — Granville-rd., "Rocklands," f., p.	1,250
Knockholt, Kent.—"Burlings" and 8 a. 1 r. 14 p., f., y.r. 33*l.*	760
"Highfield" and plot of land adjoining, 2 a. 3 r. 30 p., f., y.r. 45*l.*	850
"Sunny Bank," f., y.r. 22*l.*	410
"Holly Cottage," with farmery, 3 a. 3 r. 31 p., f., y.r. 40*l.*	820
Shelley's-la., two freehold cottages, w.r. 14*l.*	155

G. L. LUCK.

Crouch End.—9, Christ Church-rd., u.t. 72 yrs., g.r. 10*l.*, p.	900

LINNETT & LANE.

Willesden.—64 and 66, Barry-rd., f., w.r. 49*l.* 8*s.*	600
56, Barry-rd. (with laundry), f., y.r. 45*l.*	525
Harlesden.—29, 35 and 37, Minet-av., u.t. 82½ yrs., g.r. 19*l.* 10*s.*, y.r. 114*l.*	1,075

PROTHEROE & MORRIS.

Orsett, Essex.—Part of Gammon Staples Farm, 5 a. 1 r. 35 p., c.	130
Two freehold enclosures of land, 11 a. 2 r. 35 p.	785
Bexhill-on-Sea, Sussex. — Little Common, "Popp's Farm," 22¼ acres, f., p.	4,770
North Hayling, Hants.—The Langston Fishery, part f. and c., and part u.t. 60½ yrs., g.r. 101*l.*, p. (with plant, fixtures, etc.)	1,000

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beer-house; p.h. for public-house; o. for offices; s. for shops; ct. for court.

MEETINGS.

SATURDAY, JUNE 25.

Edinburgh Architectural Association.—Annual Excursion, to (1) Glamis Castle, (2) Restenneth Priory.

Junior Institution of Engineers.—Visit to the Chelsea Generating Station of the Underground Electric Railways Company of London, Lot's-road, Chelsea. 3 p.m.

MONDAY, JUNE 27.

Builders' Benevolent Institution.—Monthly Committee Meeting. 5 p.m.

TUESDAY, JUNE 28.

London Master Builders' Association.—Plumbers' Conciliation Board. 3 p.m.

Dundee Institute of Architecture.—Annual General Meeting.

SATURDAY, JULY 2.

Northern Architectural Association.—Annual Excursion: Naworth, Lanercost, and Carlisle.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and Quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 16 0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1 13 0	" " "
Facing Stocks	2 12 0	" " "
Shippers	2 10 0	" " "
Flettons	1 10 0	" at railway depôt
Red Wire Cuts	1 13 0	" " "
Best Fareham Red	3 12 0	" " "
Best Red Pressed Ruabon Facing	5 0 0	" " "
Best Blue Pressed Staffordshire	4 4 0	" " "
Do. Bullnose	4 10 0	" " "
Best Stourbridge Fire Bricks	4 8 0	" " "
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers	13 0 0	" " "
Headers	12 0 0	" " "
Quoins, Bullnose, and Flats	17 0 0	" " "
Double Stretchers	19 0 0	" " "
Double Headers	16 0 0	" " "
One Side and two Ends	19 0 0	" " "
Two Sides and one End	20 0 0	" " "
Splays, Chamferred, Squints	20 0 0	" " "
Best Dipped Salt Glazed Stretchers, and Header Quoins, Bullnose, and Flats	12 0 0	" " "
Double Stretchers	14 0 0	" " "
Double Headers	15 0 0	" " "
One Side and two Ends	16 0 0	" " "
Two Sides and one End	15 0 0	" " "
Splays, Chamferred, Squints	15 0 0	" " "
Second Quality White and Dipped Salt Glazed	14 0 0	" " "
	2 0 0	" less than best.

	s. d.	
Thames and Pit Sand	7 3	per yard, delivered.
Thames Ballast	6 0	" "

BRICKS, &c.—(*continued*).

	s. d.	
Best Portland Cement	30 0	per ton, delivered.
Best Ground Blue Lias Lime	21 0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime.....12s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 6d. per ton at rly. dpt.

STONE.

	s. d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½	" "
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2 1	" "
White Basebed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2 2½	" "

	s. d.	
Ancaster in blocks	1 11	per ft. cube, deld. rly. depôt
Beer "	1 6	" "
Greenshill "	1 10	" "
Darley Dale in blocks	2 4	" "
Red Corsehill "	2 5	" "
Closeburn Red Freestone	2 0	" "
Red Mansfield "	2 4	" "

YORK STONE—*Robin Hood Quality*

	s. d.	
Scappled random blocks	2 10	per ft. cube, "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per foot super. "
6 in. rubbed two sides ditto, ditto	2 6	" "
3 in. sawn two sides slabs (random sizes)	0 11½	" "
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½	" "
1½ in. to 2 in. ditto, ditto	0 6	" "
HARD YORK—		
Scappled random blocks	3 0	per ft. cube, "
6 in. sawn two sides, landings to sizes (under 40 ft. super.)	2 8	per ft. super. "
6 in. rubbed two sides Ditto	3 0	" "
3 in. sawn two sides (slabs random sizes)	1 2	" "
2 in. self-faced random flags	0 5	" "

Hopton Wood (Hard Bed)	in blocks	2 3	per ft. cube.
" " "	6 in. sawn both sides landings	2 7	deld. rly. depôt per ft. super. deld. rly. depôt
" " "	3 in. do.	1 2½	" "

SLATES.

in. in.	£ s. d.	
20 × 10 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
20 × 12 " "	13 17 6	" "
20 × 10 first quality "	13 0 0	" "
20 × 12 " " "	13 15 0	" "
16 × 8 " " "	7 5 0	" "
20 × 10 best blue Portmadoc	12 12 6	" "
16 × 8 " "	6 12 6	" "
20 × 10 best Eureka unfading green	15 17 6	" "
20 × 12 " "	18 7 6	" "
18 × 10 " "	13 5 0	" "
16 × 8 " "	10 5 0	" "
20 × 10 permanent green	11 12 6	" "
18 × 10 " "	9 12 6	" "
16 × 8 " "	6 12 6	" "

TILES.

	s. d.	
Best plain red roofing tiles	42 0	per 1000 at rly. depôt.
Hip and Valley tiles	3 7	per doz. " "
Best Brosely tiles	50 0	per 1000 " "
Do. Ornamental tiles	52 6	" " "
Hip and Valley tiles	4 0	per doz. " "
Best Ruabon red, brown, or brindled do. (Edwards)	57 6	per 1000 " "
Do. Ornamental do	60 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 0	" " "
Best Red or Mottled Staffordshire do. (Peakes)	51 9	per 1000 " "
Do. Ornamental do	54 6	" " "
Hip tiles	4 1	per doz. " "
Valley tiles	3 8	" " "
Best "Rosemary" brand plain tiles	48 0	per 1000 " "
Best Ornamental tiles	50 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 8	" " "
Best "Hartshill" brand plain tiles, sand faced	50 0	per 1 00 " "
Do. pressed	47 6	" " "
Do. Ornamental do	50 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 6	" " "

WOOD.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in	15 10 0	16 10 0
Deals: best 3 by 4	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 10 0	12 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	" " "
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	9 10 0
2 in. by 4½ in. and 2 in. by 5 in.	8 10 0	9 10 0
Foreign Sawn Boards—		
1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.
¾ in.	1 0 0	"

	At per load of 50 ft.	
Fir timber: best middling Danzig or Memel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Small timber (6 in. to 8 in.)	3 0 0	3 10 0
Swedish balks	2 15 0	3 0 0
Pitch-pine timber (30 ft. average)	3 5 0	3 15 0

WOOD.—(*continued*).

	At per standard. £ s. d.	£ s. d.
JOINERS' WOOD.		
White Sea: first yellow deals, 3 in. by 11 in	23 0 0	24 0 0
3 in. by 9 in.	21 0 0	22 10 0
Battens, 2½ in. and 3 in. by 7 in.	17 0 0	18 10 0
Second yellow deals, 3 in. by 11 in.	18 10 0	20 0 0
" " 3 in. by 9 in.	17 10 0	19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	15 10 0	16 10 0
Battens, 2½ in. and 3 in. by 7 in.	11 10 0	12 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0	22 10 0
Do. 3 in. by 9 in.	18 0 0	19 10 0
Battens	13 10 0	15 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0	17 0 0
Do. 3 in. by 9 in.	14 10 0	16 0 0
Battens	11 0 0	12 10 0
Third yellow deals, 3 in. by 11 in.	13 10 0	14 0 0
Do. 3 in. by 9 in.	13 0 0	14 0 0
Battens	10 0 0	11 0 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	14 10 0	15 10 0
" " 3 in. by 9 in.	13 10 0	14 10 0
Battens	11 0 0	12 0 0
Second white deals, 3 in. by 11 in.	13 10 0	14 10 0
" " 3 in. by 9 in.	12 10 0	13 10 0
" battens	9 10 0	10 10 0
Pitch-pine: deals	16 10 0	20 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—First, regular sizes	35 0 0	upwards.
Oddments	24 0 0	26 0 0
Seconds, regular sizes	26 10 0	28 10 0
Yellow Pine oddments	22 0 0	24 0 0
Kauri Pine—Planks, per ft. cube	0 3 6	0 5 0
Danzig and Stettin Oak Logs—Large, per ft. cube	0 2 6	0 3 6
Small " "	0 2 3	0 2 6
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 7	0 0 8
¼ in. do. do.	0 0 6½	—
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	17 0 0	21 0 0
American Whitewood Planks—per ft. cube	0 4 0	—

	Per square.	
Prepared Flooring—		
1 in. by 7 in. yellow, planed and shot	0 13 6	0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	0 13 6
¾ in. by 7 in. do. do.	0 14 0	0 18 0
1 in. by 7 in. white do.	0 10 0	0 11 6
1 in. by 7 in. do. do.	0 11 6	0 13 6

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	6 5 0 ...	7 5 0
Compound Girders, ordinary sections	8 2 6 ...	9 5 0
Angles, Tees and Channels, ordinary sections	7 17 6 ...	8 17 6
Flitch Plates	8 5 0 ...	8 15 0
Cast Iron Columns and Stanchions including ordinary patterns	7 2 6 ...	8 5 6

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON—		
Common Bars	7 5 0 ...	7 15 0
Staffordshire Crown Bars, good merchant quality	7 15 0 ...	8 5 0
Staffordshire "Marked Bars"	10 0 0 ...	—
Mild Steel Bars	8 15 0 ...	9 5 0
Hoop Iron, basis price	9 5 0 ...	9 10 0
" " Galvanized	17 10 0 ...	—
("And upwards, according to size and gauge.)		
Sheet Iron (Black)—		
Ordinary sizes to 20 g.	9 15 0 ...	—
" " 24 g.	10 15 0 ...	—
" " 26 g.	12 5 0 ...	—
Sheet Iron, Galvanised, flat, ordinary quality—		
Ordinary sizes—6 ft. by 2 ft. to 3 ft. to 20 g.	12 15 0 ...	—
Ordinary sizes to 22 g. and 24 g.	13 5 0 ...	—
" 26 g.	14 5 0 ...	—
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes to 20 g.	16 0 0 ...	—
" " 22 g. and 24 g.	16 10 0 ...	—
" " 26 g.	18 0 0 ...	—
Galvanised Corrugated Sheets—		
Ordinary sizes 6 ft. to 8 ft. 20 g.	12 10 0 ...	—
" " 22 g. and 24 g.	13 0 0 ...	—
" " 26 g.	13 15 0 ...	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11 15 0 ...	—
Best Soft Steel Sheets, 22 g. & 24 g.	12 15 0 ...	—
" " 26 g.	14 0 0 ...	—
Cut nails, 3 in. to 6 in.	9 0 0 ...	9 10 0

(Under 3 in., usual trade extras.)

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3lb. and up	14 5	... —
Pipe in coils	14 15	... —
Soil pipe	17 5 0	... —
Compo pipe	17 5 0	... —

LEAD, &c.—(*continued*).

	Per ton.	in London.
	£ s. d.	£ s. d.
ZINC—Sheet—		
Vieille Montagne ....ton	27 0 0 ...	—
Silesian....	26 15 0 ...	—
COPPER—		
Strong Sheet....per lb.	0 0 10½ ...	—
Thin „ .... „	0 0 11½ ...	—
Copper nails .... „	0 0 11 ...	—
BRASS—		
Strong Sheet.... „	0 0 10 ...	—
Thin „ .... „	0 0 11 ...	—
TIN—English Ingots .... „	0 1 3½ ...	—
SOLDER—Plumbers' .... „	0 0 6½ ...	—
Tinmen's.... „	0 0 8 ...	—
Blowpipe.... „	0 0 9 ...	—

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
„ fourths....	1¾d. „ „
21 oz. thirds	3½d. „ „
„ fourths....	2½d. „ „
26 oz. thirds	4d. „ „
„ fourths....	3¼d. „ „
32 oz. thirds	5d. „ „
„ fourths....	4¼d. „ „
Fluted Sheet, 15 oz....	3d. „ „
„ 21 oz....	4d. „ „
¼ Hartley's Rolled Plate	1⅝d. „ „
⅜ „ „ „ „	1⅞d. „ „
½ „ „ „ „	2⅛d. „ „

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes....	per gallon	0 1 5½
„ „ „ in barrels	„	0 1 6½
„ „ „ in drums	„	0 1 9
Boiled „ „ in pipes....	„	0 1 8
„ „ „ in barrels....	„	0 1 9
„ „ „ in drums	„	0 2 0
Turpentine, in barrels	„	0 3 6
„ in drums	„	0 3 8
Genuine Ground English White Lead	per ton	18 15 0
Red Lead, Dry....	„	18 10 0
est Linseed Oil Putty	per cwt.	0 6 6
Stockholm Tar....	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak....	0 10 0
Superfine Hard-drying Oak, for seats of Churches....	0 14 0
Fine Elastic Carriage....	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan....	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

PUBLISHER'S NOTICES.

Nat. Tel., 6112, Gerrard. Telegrams, "The Builder, London."

THE INDEX (with TITLE-PAGE) for VOLUME LXXXV. (July to December, 1903) was given as a supplement with issue of January 9 last.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also

READING CASES (Cloth), with Strings, price 9d. each.

THE EIGHTY-FIFTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence.

SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 3s. 6d. each.

CHARGES FOR ADVERTISEMENTS.

COMPETITIONS, CONTRACTS, ALL NOTICES ISSUED BY CORPORATE BODIES, COUNTY AND OTHER COUNCILS, PROSPECTUSES OF PUBLIC COMPANIES, SALES BY TENDER, LEGAL ANNOUNCEMENTS, &c., &c.

Six lines, or under .... 6s. 0d.
Each additional line .... 1s. 0d.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE AND GENERAL ADVERTISEMENTS.

Six lines or under .... 4s. 6d.
Each additional line .... 0s. 6d.

Terms for series of Trade advertisements, and for front page, and other special positions, on application to the Publisher.

SITUATIONS WANTED (Single-handed—Labour only).

FOUR lines (about thirty words) or under .... 2s. 6d.
Each additional line (about ten words) .... 0s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps *must not* be sent, but all sums should be remitted by Postal Orders, payable to J. MORGAN, and addressed to the Publisher of "THE BUILDER," Catherine Street, W.C.

Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the Outside Wrapper should be in by TWELVE noon on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS advertising in "THE BUILDER" may have *Replies addressed to the Office*, Catherine Street, Covent Garden, W.C., *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES { NINEPENCE EACH. By post (carefully packed) 1s.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100*l*., unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

BARNET.—For new post office, for H.M. Office of Works :—

		Credit old materials.
Thompson & Co.	£5,037 0 0	£25 0 0
Webster & Cannon ..	4,628 0 0	52 10 0
C. Miskin & Sons....	4,360 0 0	12 0 0
General Builders, Ltd.	4,299 0 0	25 0 0
J. Stewart....	4,219 0 0	25 0 0
S. Worboys	4,218 0 0	33 0 0
Mallock & Parsons ..	4,199 0 0	30 0 0
Oak Building Co. Ltd.	4,195 0 0	60 0 0
A. E. Townsend	4,174 0 0	26 0 0
Hockley & Co.	4,048 0 0	48 0 0
W. H. Hinkins....	4,040 0 0	29 10 0
Shrouder & Matthews	3,986 2 0	25 0 0
W. H. Lorden & Son.	3,919 0 0	25 0 0
F. G. Minter....	3,890 0 0	—
C. Ansell	3,800 0 0	50 0 0
W. H. Sharpe	3,775 0 0	55 10 0
Foster Bros.	3,737 0 0	42 0 0
G. Wiggs	3,724 0 0	51 0 0
J. Shelbourne & Co...	3,712 0 0	46 0 0
Rowley Bros.	3,650 0 0	21 0 0
A. W. Nash	3,648 0 0	55 0 0
P. Banyard	3,592 10 0	57 10 0
F. & A. Willmott ..	3,411 0 0	30 0 0

BECKENHAM.—For the erection of new works, for Mr. H. Turney, at Clock House Beckenham. Mr. C. J. Kohler, architect, 56, Cheapside, E.C.:—

T. Watt	£4,800 0 0	F. W. Green	£3,712 0 0
T. Inkpen ..	4,150 0 0	W. Douns & Co.	3,655 0 0
Syme & Duncan	3,988 0 0	T. W. Jones	3,533 0 0
T. Ingo	3,863 15 0	W. J. Norris	3,474 0 0
W. Holt	3,800 0 0	T. G. Nicolls & Son* ..	3,346 8 6
Colley & Sons	3,785 0 0		
W. Renuick ..	3,742 0 0		

BRENTFORD.—For construction of an underground public convenience, Kew Bridge, for the Urban District Council. Mr. Nowell Parr, Engineer and Surveyor, Clifden House, Boston-road, Brentford :—

Doulton & Co...	£4,106 0	Wisdom Bros.	£3,700 0
W. J. Renshaw	3,979 0	Chambers Bros.	3,685 10
Finch & Co. ..	3,977 0	A. & B. Hanson	3,681 0
Jennings, Ltd...	3,953 0	B. E. Nightingale	3,659 0
J. W. Brooking	3,897 0	E. Wall	3,630 0
G. H. Gibson ..	3,859 0	W. J. Dickens	3,590 0
Soole & Sons ..	3,800 0	Dorey & Co., Brentford* ..	3,498 0
Perry Bros....	3,777 0		
A. C. Heywood	3,752 0		
F. & H. F. Higgs	3,725 0		

BRENTFORD.—For extension of wholesale produce market, Kew Bridge, for the Urban District Council. Mr. Nowell Parr, engineer and surveyor, Clifden House, Boston-road, Brentford :—

H. M. Patrick....	£50,129	Mowlem & Co. ..	£46,823
J. W. Brooking ..	49,846	B. E. Nightingale	46,815
Messom & Sons ..	49,111	Soole & Sons	45,970
F. & H. F. Higgs ..	48,975	Wisdom Bros.....	44,675
Perry Bros.	47,549	G. H. Gibson	44,269
W. J. Dickens ..	47,530	W. Wallis.....	44,000
Perry & Co.....	47,490	E. Wall	43,633
A. & B. Hanson..	47,182	Dorey & Co., Brentford*	43,302
Pethick Bros....	47,166		

BRYNMAWR.—For alterations and renovation of Rehoboth Congregational Church. Messrs. Habershon & Fawckner, architects, 41, High-street, Newport :—

S. T. Davies & Sons	£1,534	J. Jenkins, Brynmawr*	£1,197
T. S. Foster	1,380	W. Jewell & Sons	1,195
J. Morgan.....	1,325	D. W. Richards ..	1,193
O. S. Morgan & Co.	1,250	C. Shopland	1,188

CARDIFF.—For reconstructing No. 162, Bute-street, for Mr. M. Del Guerra. Mr. D. C. Salmond, architect, 15, Queen-street, Cardiff :—

G. Hallett	£1,603 0	F. Couzens & Son	£1,290 0
J. H. Venning	1,423 0	F. Small, Cardiff*	1,250 0
C. Totterdell ..	1,387 16		
G. H. Elkington	1,304 0		

* CARLISLE. — For Cumwhinton reservoir, filters, mains, etc. (Contract No. 1), for the Corporation. Messrs. James Mansergh & Sons, engineers, 5, Victoria-street, Westminster, S.W. :—

Morrison & Mason, Ltd.	£176,089 16 8
W. Scott & Middleton	163,688 8 5
T. Cook Starkey	158,903 3 10
J. Best	142,631 6 6
J. Aird & Sons.....	134,632 15 8
W. Kennedy, Ltd., Partick*..	120,377 19 3
Bushby & Sons	119,136 15 3
R. C. Brebner & Co.	114,562 4 3
G. Mackay & Sons	97,991 15 6

DRIFFIELD.—For alterations to premises, No. 64, Market-place, for Messrs Tate & Durrans. Mr. J. Shepherdson, architect, 15, Manor-street, Bridlington :—

A. A. Booth ..	£438 0 0	C. W. Dry	£314 12 0
J. Dunn	425 0 0	H. Naylor, Driffield*.....	298 0 0
A. Leason	362 0 0		
W. Leason & Son	339 0 0		

EAST STONEHOUSE (Devon).—For stoneware pipe sewers, Peel-street, and part of Brownlow-street, for the Urban District Council. Mr. F. A. Wiblin, surveyor, Town Hall, East Stonehouse :—

R. T. Hortop & Co., Plymouth, Devon*.. £235 6 0

EAST PECKHAM.—For reconstructing three Bran bridges, etc., for the Kent County Council. Mr. F. W Ruck, County Architect, Maidstone :—

Thomas & Edge	£13 850 0 0
A. Fasey & Sons	13,621 1 9
T. Elmore & Son.....	13,491 0 0
Wallis & Sons, Ltd.	13,443 0 0
A. E. Nunn	13,171 0 0
Jarvis & Son	12,488 0 0
F. Miskin, Ltd., Rochester*	11,988 18 0

ERITH.—For additions and alterations to the electr light station (Contract No. 6), for the Urban Distr Council. Quantities by Mr. W. Egerton, 12, Queen road, Erith :—

F. Spencer & Son	£2,780 0	Thomas & Edge	£2,303
J. T. Jarvis & Son	2,665 15	G. H. Gunning & Sons.....	2,273 1
F. G. Minter ..	2,424 0	Foster Bros. ..	2,256 0
J. Shelbourne & Co.	2,376 0	Friday & Ling, 15, The Nursery, Erith*	2,200 0
Ennes Bros. ..	2,362 0	T. G. Sharpington	2,198 0
B. E. Nightingale	2,337 0		

ERITH.—For steel road bridge with brick and concrete abutments, at Lower-road level crossing, for the Urban District Council. Messrs. Hawtayne & Zeden, engineers, 9, Queen-street-place, London, E.C.:—

Heenan & Froude, Ltd.	£14,392 15 6
A. Thorne	12,270 8 0
Motherwell Bridge Co., Ltd. ..	11,154 1 3
Lambert & Edwards	11,110 12 7
G. Wimpey & Co.....	10,883 16 2
J. B. Squire & Co.	10,555 13 0
J. Shelbourne & Co.....	10,134 0 0
Friday & Ling	10,091 19 10
Muirhead, Greig, & Matthews..	9,963 8 10
J. G. White & Co., Ltd.....	9,927 3 10
G. H. Gunning & Sons	9,800 0 0
E. C. & J. Keay, Ltd.....	9,737 1 7
A. Dixon & Co.....	9,731 4 4
G. Bell	9,697 0 0
W. Kennedy	9,647 15 1
Enness Bros.	9,620 0 0
J. A. Ewart	9,423 7 3
E. Wood & Co.	9,315 9 0
A. Fasey & Co.	9,032 8 10
Mayoh & Haley.....	8,825 8 4
Wilkinson Bros.	8,686 0 0
W. Pattinson & Sons, 50, Parliament-street, S.W.*	8,329 0 0

EXETER.—For erecting new infirmary and alterations to existing infirmary at City Workhouse, for the Guardians. Mr. R. M. Challice, architect, 14, Bedford-circus, Exeter :—

R. Wilkins & Sons	£14,489	W. Brealy	£10,899
Dart & Pollard ..	13,300	G. Herbert	10,616
A. N. Coles	12,030	Westcott, Austin, & White	10,599
W. G. Coles.....	11,491	Ham & Passmore, Exeter*	10,514
W. E. Blake	11,330		
Stephens & Son, Ltd.	11,299		

FARNBOROUGH (Kent).—For the erection of a pair of cottages, for Mrs. Child. Mr. Money Marsland, architect, 68, Great Tower-street, E.C. :—

W. Owen* £500

FISHPONDS (Bristol).—For constructing a road and sewer (portion of Elmdale-road), for the Fishponds and Bedminster Brick and Tile Co., Ltd. Mr. W. Saunders, architect and surveyor, Rupert-chambers, Quay-street, Bristol. Quantities by the surveyor :—

Wilkins & Gosling, Ashley-road, Bristol* £225
[Lowest of eleven tenders.]

GILLINGHAM (Norfolk).—For outbuildings, infants room, and cloak-rooms, for the Managers of Gillingham Hall Non-Provided Schools. Mr. Arthur Pells, F.S.I., architect, Beccles :—

C. Kent	£410 0 0	A. D. Boddy & Son	£340 0 0
J. W. Frost ..	395 0 0	G. Johnson ..	309 3 9
C. C. Betts....	389 13 0	J. Gaze, Carlton Colville*	285 10 0
A. Hawes	352 18 6		
F. J. Allen	343 0 0		

HEADINGTON (Oxfordshire).—For main drainage works, Headington and Cowley, for the Headington Rural District Council. Mr. H. H. Humphreys, engineer, 28, Victoria-street, Westminster :—

Headington Parish.

G. Horber, Rutland-road, East Ham*.. £4,756 15 9

Cowley Parish.

J. H. Macdonald, Talgarth, Breconshire* £4,826 19 0

LEMINGTON.—For erecting new church, for the Methodist New Connexion. Mr. B. R. Irvin, architect, 58, Avenue-road, Gateshead. Quantities by architect :—

W. Hall	£1,321 4 2	Davison & Bolam	£1,237 19 6
T. Harver ..	1,264 7 10	J. Browell ..	1,236 9 3
H. Maughan	1,247 2 6	E. & A. Storey	1,180 0 7
P. Thirlwell & Son, Benwell-on-Tyne*	1,238 1 0	T. & J. White	1,133 8 8

[Without painting and glazing.]

LONDON.—For repaving works, New Tothill-street, Westminster, for the Westminster City Council :—

	s. d.
Limmer Asphalte Co.*	
2-in. asphalte on 6-in. concrete, per square yard	12 0
6 to 1 cement concrete, including excavation, per cubic yard	18 0
2-in. asphalte, hacking over and floating, with 2 to 1 p.c. concrete, 1 in. thick, to new levels	10 0

LONDON.—For repairs (cleaning, painting, etc.) at nineteen underground public conveniences in the City of Westminster, for the Westminster City Council :—

T. W. Haylock..	£305 0 0	S. & S. Dunn ..	£165 5 0
T. Coulthard....	208 2 0	Love & Co.* ..	158 0 0
J. R. Sims	186 7 0	J. D. Hobson§..	150 2 8

§ Tender informal.

TENDERS—*Continued on page* 705

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Required.	Premiums.	Designs to be Delivered
*Mortuary and Columbarium	Hampstead Borough Council	Not stated	Sept. 30
Library for Townhead	Glasgow Corporation	Not Stated	No date.
Library for Pollokshields	do.	Not Stated	do.

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be delivered
Machine Tools, Shafting, Gearing, etc.	Glasgow Corporation	Office of Public Works, 64, Cochrane-street, Glasgow	June 25
Engineers' Hand Tools and Furnishings for Workshops	do.	do.	do.
Six Houses, Kingswood-road, Prestwich	Co-operative & Industrial Soc., Ltd.	At Offices, Warwick-street, Prestwich	do.
Ayr District Asylum Hospital	Ayrshire County Council	J. B. Wilson, Architect, 92, Bath-street, Glasgow	do.
Scavenging Parish of Cockerton	Darlington R.D.C.	J. Robinson, Sanitary Inspector, Union Offices, Darlington	do.
Harehills United Meth. Free Church, Ashley-rd., Leeds		H. Ascough Chapman, Arch., Prudential-buildings, Park-row, Leeds	do.
Public Conveniences, West Orchard	Coventry General Works Committee	J. E. Swindlehurst, City Engineer, St. Mary's Hall, Coventry	June 27
Urinals	do.	do.	do.
Telephonic Installation at Hospital, Aikin-street	Warrington Health Committee	F. V. L. Mathias, Borough Electrical Engineer, Howley, Warrington	do.
Additions, etc., Minshall Vernon National School		J. Cawley, Architect, Central-chambers, Northwich	do.
Fireclay, Retorts, Bricks, etc.	Carlisle Gas Committee	W. J. Smith, Engineer, Gasworks, Carlisle	do.
Tiled Dadoes at Municipal Schools	Manchester Education Committee	Offices in Deansgate, Manchester	do.
Timber for Handicraft Centres	do.	do.	do.
Woodpaving, Goswell-road	Finsbury Borough Council	Borough Surveyor, Finsbury Town Hall, Rosebery-avenue, E.C.	do.
Concreting, Devonshire-street Council School	Salford Education Committee	H. E. Stelfox, A.R.I.B.A., 6, Princes-street, Manchester	do.
Direct Current Electricity Meters	Radcliffe U.D.C.	S. Mills, Clerk, Council Offices, Radcliffe, Lancs.	do.
Switchboards and Temporary Gear	Rochdale Corporation	Lacey, Sellar, & Leigh, Eng'rs., 2, Queen Anne's-gate, Westminster	do.
Electricity Cables	Edinburgh Corporation	Resident Electrical Engineer, 5, Dewar-place, Edinburgh	do.
Plant House, Victoria Park, Waterloo, Lancs.	Waterloo U.D.C.	F. Spencer Yates, Surveyor, Town Hall, Waterloo	do.
Cottage at Carlbury, Piercebridge	Rt. Hon. Lord Barnard	At the Office, Sawmills, Staindrop	do.
Renewing Slating, etc., at Workhouse	Canterbury Guardians	G. Smith, Architect, 34, Station-road West, Canterbury	do.
Street Works, Park-lane, Chadwell	Ilford U.D.C.	H. Shaw, Surveyor, Town Hall, Ilford	do.
Fencing, Goodmayer Recreation Ground	do.	do.	do.
Electric Light Wiring Installation	Stepney Borough Council	M. W. Jameson, Borough Engineer, 15, Great Alie-street, E.	June 28
Drain and Footpath, Brighton-road	Godalming Town Council	J. H. Norris, Borough Surveyor, Godalming	do.
Painter Work, George Heriot's School, etc.	George Heriot's Trust	Mr. Anderson, Superintendent of Works, 20, York-place, Edinburgh	do.
Painting, Paperhanging, etc., at Homes	Plymouth Incorporat'n of Guardians	W. Adams, Clerk, 13, Princess-square, Plymouth	do.
Private Improvement Works in Passages	Bootle Corporation	Borough Engineer's Office, Bootle	do.
Two "National" Independent Dome-top Boilers	Brighton Guardians	B. Burfield, Clerk, Parochial Offices, Brighton	do.
Paving with Soft Wood Part of Seven Sisters-road	Stoke Newington Borough Council	W. F. Loveday, Boro' Surv., Town Hall, Milton-rd., Stoke Newington	do.
Offices, Kington	Old Radnor Trading Co., Ltd.	C. Stuart Delfosse, Architect, Kington	do.
3,200 yds. of 18-in. Diameter Cast-Iron Pipes	Glasgow Corporation	A. Wilson, Gas Engineer, 45, John-street, Glasgow	do.
2,700 yds. of Trench Work, etc.	do.	do.	do.
Lead-Covered and Armoured Cables	St. Pancras Borough Council	Chief Clerk, Electricity Department Offices, 57, Pratt-street, N.W.	do.
Arc Lamp Carbons	do.	do.	do.
Technical and Secondary Schools	Chorley Corporation	Cheers & Smith, Architects, 24, Richmond-terrace, Blackburn	June 29
Painting Buildings at Sewage Works	Salford Corporation	Borough Engineer's Office, Town Hall, Salford	do.
Cast-Iron Pipes and Valves at Sewage Works	do.	do.	do.
Thirty-four Houses at Trelewis	Messrs. Lewis	T. Roderick, Architect, 50, Glebeland, Merthyr	do.
Three Houses at Glasnevin	St. Vincent de Paul Orphanage	Hague & McNamara, Architects, 50, Dawson-st., Dublin	do.
Reception House at Baird-street	Glasgow Corporation	A. B. M'Donald, City Engineer, 64, Cochrane-st., Glasgow	do.
Whinstone Boundary Walls, Hospital Site, Gateside	Greenock, etc., Hospital Committee	C. Macculloch, Town Clerk, Greenock	do.
Painting, etc., St. Michael's Ch, Ashton-under-Lyne		T. J. Barlow, Hon. Sec., Athol House, Fraser-st., Ashton-und'r-Lyne	do.
Nine Water-Closets, etc., Giles-square, Richmond-road	Leeds Corporation	City Engineer's Office, Municipal-buildings, Leeds	do.
Stone Steps, Kerbing, Channelling	Blackpool Highways Committee	J. S. Brodie, Borough Engineer, Town Hall, Blackpool	do.
Painting, etc., Woolwich Infirmary, etc., Plumstead	Woolwich Guardians	The Steward's Office	do.
Making-up Oak-avenue, Enfield	Enfield U.D.C.	R. Collins, Surveyor, Public Offices, Enfield	do.
Making-up Part Alma-road, Ponders End	do.	do.	do.
Direct-current Motors	Manchester Electricity Committee	F. E. Hughes, Sec., Electricity Dept., Town Hall, Manchester	June 30
Motor Starters	do.	do.	do.
Low-pressure Cables	do.	do.	do.
Cable Troughing (Iron and Wood)	do.	do.	do.
Bitumen and Box Compound	do.	do.	do.
Valve Rods and Copper Wire Screens, Talla Scheme	Edinburgh & District Water Trustees	W. A. Tait, C.E., 72A, George-street, Edinburgh	do.
Steel Joists, and Collars, Talla Scheme	do.	do.	do.
Alnwickhill Filters Extension	do.	do.	do.
Repaving Manchester-road	Worsley U.D.C.	Surveyor, Public Offices, Hilton-lane, Walkden	do
Bank House, Ballyhannis, co. Mayo	Directors of Ulster Bank	W. H. Stephens & Son, Donegal-square North, Belfast	do.
Painting in Recreation Grounds	Withington U.D.C.	A. H. Mountain, Surveyor to Council, Town Hall, West Didsbury	do.
54 yds. of 18-in. Syphon under Chorlton Brook	do.	do.	do.
Street Works, Duke-street and Baguley-street	Droylsden U.D.C.	C. Hill, Surveyor, 10, Ashton-road, Droylsden	do.
Stoneware-pipe Sewer at Edenfield, etc.	Ramsbottom U.D.C.	J. Diggle & Son, Engineers, 14, Victoria-street, Westminster, S.W.	do.
Stores	Bomb., Baroda, & C. India Ry. Co.	T. W. Wood, Sec., Gloucester House, Bishopsgate-st. Without, E.C.	do.
5¼ miles c.c. Watermains	Fareham U.D.C.	W. Butler, Engineer, Council Offices, Quay-street, Fareham	do.
Cast-Iron Plates, etc., in Gangway to Condenser Bay	Manchester Electricity Committee	F. E. Hughes, Sec., Electricity Department, Town Hall, Manchester	do.
Silencer and Drain Work in Yard	do.	do.	do.
Gangways in Boiler House No. 2	do.	do.	do.
Stone Bridge at Brushford, over the Avon	Totnes R.D.C.	R. Tucker, Highway Surveyor, Hazard, Totnes	do.
Rebuilding Lumb Bridge, Fawfieldhead	Leek R.D.C.	Union Offices, Russell-street, Leek	July 1
Steam Rolling	East Sussex County Council	F. J. Wood, County Surveyor, County Hall, Lewes	do.
Iron Fire-escape Staircases at Workhouse	Windsor Guardians	P. Lovegrove, Clerk, 3, Park-street, Windsor	do.
Hotel and Premises at Caeran, near Maesteg	.....	P. J. Thomas, Architect, Station-hill, Bridgend	do.
Dwelling-house, Crofts	.....	C. C. Doig, Architect, Elgin	do.
Churchyard Boundary Wall, Ainderby Steeple	.....	Churchwardens, Ainderby Steeple Vicarage, Northallerton	do.
Tramway Generating Plant (Two Contracts)	Exeter Corporation	H. D. Munro, City Electrical Engineer, Municipal Offices, Exeter	do.
Steam Dynamo	Rochdale Corporation	Lacey, Sellar, & Leigh, Eng'rs., 2, Queen Anne's-gate, Westminster	do.
Roof, Manorhamilton Parish Church	.....	J. Nixon, Hon. Sec., Sele't Ves., The Stores, Manorhamilton, Ireland	do.
Alterations, etc., Bible Chr'tian Chpl, High Bickington	.....	W. Gooding, High Bickington, Devon	do.
Alterations, etc., Six Cottages, Station-rd., Kenfig Hill	.....	Mason's Arms, Kenfig Hill, Wales	do.
*New Coastguard Buildings, Cliffe Creek, nr. Gravesend	Admiralty	Director of Works Department, 21, Northumberland-avenue, W.C.	do.
*New Coastguard Buildings at Boscastle	do.	Superintending Civil Engineer H.M. Dockyard, Devonport	do.
*Supply of Materials, etc.	Ealing Town Council	Borough Surveyor, Town Hall, Ealing, W.	July 2
400 tons of Cast-Iron Pipes	Glasgow Corporation	J. R. Sutherland, Engineer, Water Depart., 45, John-st., Glasgow	do.
Cast-Iron Gas Condenser, etc., New Wortley Works	Leeds Gas Committee	R. H. Townsley, Manager, Gas Offices, East-parade, Leeds	do.
Altera., etc., Police Bdgs., Wath, Melmerby, nr. Ripon	N. Riding County Council	W. H. Brierley, County Architect, 13, Lendal, York	do.
Overhead Cranes, Lifting Tackle, etc.	The L.C.C.	County Hall, Spring-gardens, S.W.	do.
Pair of Police Cottages at Bognor	West Sussex County Council	W. McIntosh, County Surveyor, 22, Worthing-road, Horsham	do.
Additions to ~~Elementary Schools at~~ Middle Rasen	Lindsey County Council	Scorer & Gamble, Architects, Bank Street-chambers, Lincoln	do.
Additions to Elementary Schools, Ashby Puerorum	do.	do.	do.
Brick Abutments, Road Work, etc., Ford, Harlow	Essex County Council	P. J. Sheldon, Surveyor, Chelmsford	July 4
Storage Reservoir, etc., Glenquey Burn	Dumfermline District Committee	W. R. Copland, C.E., Engineer, Glasgow	do.
Main Conduit from Glendevon to Milesmark	do.	do.	do.
Main Conduit from Saline to Redcraigs	do.	do.	do.
2,500 to 3,000 tons of Purifying Lime	Sheffield United Gaslight Co.	H. Thomas, Manager, Commercial-street, Sheffield	do.
Alterations to Boundary Walls at Cemetery	Chester-le-Street Burial Joint Comt.	Superintendent's Office, Ropery-lane, Chester-le-Street	do.
Electricity Meters	Heston and Isleworth U.D.C.	J. and J. S. Enright, Engineers, 68, Lincoln's-inn-fields, W.C.	

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be delivered
Painting, etc., Schools	Handsworth Education Committee	T. H. Moon, Sec., Education Offices, Soho Hill, Handsworth	July 4
Painting, Colouring, etc., Schools	Salford Corporation	Director of Education, Chapel street, Salford	do.
Flints	Arundel Town Council	E. F. Farrington, Borough Surveyor, Town Hall, Arundel	do.
Reading Room and Hall, Queenstown, Ireland	Young Men's Society	S. F. Hynes, Architect, 21, South Mall, Cork	do.
Residence, The Knoll, Shepley, Huddersfield	.....	E. W. Lockwood, Architect, Huddersfield	do.
Granite, Tar, Macadam, etc.	Waltham Holy Cross U.D.C.	W. Turner-Streather, Highbridge-street, Waltham Abbey	do.
Alterations, Painting, etc., No. 15, South-street	Dorchester Conservative Club	F. T. Maltby, Architect and Surveyor, Dorchester	do.
Reconstruction of 150 Railway Waggons	Glasgow Corporation	D. M'Coll, City-chambers, 64, Cochrane-street, Glasgow	do.
*Sewage Works, Painter's-lane, Enfield	Cheshunt U.D.C.	A. C. Lee, Clerk, Manor House, Cheshunt	do.
Repairs, Bloomfield Council School	Tipton U.D.C.	A. Long, Architect, 21, New-street, West Bromwich	July 5
High-speed Engine, Portrau Asylum, near Donabate	Richmond District Asylum	Asylum Offices, Grangegorman, Dublin	do.
Eskdalemuir Observatory Works (First Contract)	Commissioners of H.M. Works, etc.	W. T. Oldrieve, Architect, 3, Parliament-square, Edinburgh	do.
Free Library at Clitheroe	Clitheroe Corporation	S. Butterworth & Duncan, Architects, Rochdale	do.
2½ miles of 9-in. Sewer, near Baldock	First Garden City, Ltd.	G. R. Strachan, Engineer, 7, Victoria-street, Westminster	do.
Two Oil or Gas Engines and Dynamo	Penrith U.D.C.	G. Wainwright, Clerk, Public Offices, Penrith, Cumberland	do.
Switchboard and Boosters	do.	do.	do.
Storage Battery	do.	do.	do.
Mains	do.	do.	do.
*Roadmaking Works	Tottenham U.D.C.	Council's Engineer, 712, High-road, Tottenham, N.	do.
*Erect'n of Covered Shelters, Infirmary, Brook-st., S.E.	Lambeth Guardians	Guardians' Offices, Brook-street, Kennington-road, S.E.	July 6
Street Improvement at Back-lane	Chiswick U.D.C.	J. Barclay, Surveyor, Town Hall, Chiswick	do.
Excavating Trenches, Laying Pipes, etc., Brook's-lane	do.	do.	do.
Painting, etc., at Schools	do.	do.	do.
Wall at Sewage Disposal Works	do.	do.	do.
Four Cast-Iron Hot-water Storage Tanks for Baths	Glasgow Corporation	Office of Public Works, 64, Cochrane-street, Glasgow	do.
*Artesian Well, East Dulwich	Camberwell Guardians	W. M. Binney, 53, Victoria-street, Westminster, S.W.	do.
Public Conveniences, Mitchell-street	Glasgow Corporation	Office of Public Works, 64, Cochrane-street, Glasgow	July 7
Stores, Gas Department	Salford Corporation	W. W. Woodward, Engineer, Bloom-street, Salford	do.
Hotel, etc., Argoed, Mon.	P. L. Lloyd	B. J. Francis, Architect, Abergavenny	do.
Additions, etc., to Glenburgie Distillery, Forres	.....	C. C. Doig, Architect, Elgin	do.
Organ Chamber and Vestry, St John's Ch., Ripon	.....	C. Hodgson Fowler, F.S.A., Architect, The College, Durham	do.
1,000 tons of Granite Metalling	Newmarket U.D.C.	S. J. Ennion, Clerk, Deva-chambers, Newmarket	July 8
*Glazed Drain Pipes	County Borough of Brighton	Borough Engineer, Town Hall, Brighton	do.
*New Sorting Office, Winchmore Hill, N.	H.M. Works	H.M. Office of Works, Storey's-gate, Westminster, S.W.	do.
Painting and Decorating Council Schools	Ipswich Education Committee	E. T. Johns, Thoroughfare, Ipswich	July 9
Road Bridge of Two Spans at Howford, Nairn	Nairn County Council	P. M'Farlane Cram, C.E., Albert-street, Nairn	do.
Stones for Repair of Highways	Luton R.D.C.	B. B. Franklin, Surveyor, 21, Market-hill, Luton	do.
House and Shop at Blaenyffos	.....	T. Luke, Post Office, Blaenyffosey, R.S.O.	do.
Two Portable Electric Gantry Cranes, Queen's Quay	Belfast Harbour Commissioners	W. A. Currie, Secretary, Harbour Office, Belfast	July 11
Harbour Works, Invergordon	.....	G. Gordon & Co., Engineers, Inverness	do.
Underground Telephone Pipes, etc.	Manchester Corporation	City Surveyor's Office, Town Hall, Manchester	do.
Twenty Dust Vans and Twenty Slop Vans	Bethnal Green Borough Council	R. Voss, jun., Town Clerk, Church-row, Bethnal Green, E.	do.
9,700 yds. Cast-Iron Watermains	Newark R.D.C.	H. Walker & Son, Engineers, Albion-chamb., King-st., Nottingham	do.
Meter House	do.	do.	do.
Water-Tube Boilers	Handsworth U.D.C.	H. Ward, Clerk, Council House, Handsworth, Birmingham	do.
Engines and Dynamos	do.	do.	do.
Overhead Hand Travelling Crane	do.	do.	do.
Storage Battery	do.	do.	do.
Arc Lamps and Posts	do.	do.	do.
Switchboard and Boosters	do.	do.	do.
*New School at Henshaw-street	Stretford Education Authority	E. Woodhouse, 88, Mosley-street, Manchester	do.
*Sewage Works, Greyhound-lane, Streatham	Wandsworth Borough Council	Surveyor's Offices, 215, Fulham High-road, S.W.	do.
*Foundation of New Road at Wood Green	The Company	Vigers & Co., 4, Frederick's-place, Old Jewry, E.C.	do.
Manilla Rope	Birkenhead Corporation	Manager's Office, Woodside Ferry, Birkenhead	July 12
Private Street Works, Rigby-road	Southampton Corporation	J. A. Crowther, Boro' Engineer, Municipal Offices, Southampton	do.
Fire Brigade Hose Carriage	Dundee Town Council	Firemaster, Central Station, Dundee	do.
*New Baths, etc., at Caterham Asylum	M.A.B.	Office of the Board, Embankment, E.C.	do.
*Porter's Lodge, Discharge Block, etc., Hos., Mortlake	Barnes U.D.C.	Council's Engineer, High-street, Mortlake	do.
Pumping Machinery (Contract No. 5)	Derby Corporation	J. Mansergh & Sons, Engineers, 5, Victoria-street, Westminster	July 13
800 yds. of Brick Culvert, 3 ft. 6 in. diameter	Newcastle-under-Lyme Corporation	Willcox & Raikes, Engineers, 63, Temple-row, Birmingham	do.
Screening Chamber, Pump Well, and Engine House	do.	do.	do.
Diversion of Lyme Brook and Roadway	do.	do.	do.
Bacteria Beds and Laying Out, etc., Irrigation Area	do.	do.	do.
*Making-up Paving & Sewering, Clancarty-rd., Sec. II.	Fulham Borough Council	Borough Surveyor, Town Hall, Fulham, S.W.	do.
*New Coastguard Buildings at Weybourne, Norfolk	Admiralty	Admiralty Office, 21, Northumberland-avenue, W.C.	July 15
Hydraulic Machinery, New Dock Works, Avonmouth	Bristol Docks Committee	W. W. Squire, Engineer, Cumberland-road, Bristol	July 25
Car Shed Buildings	Johannesburg Council	Mordey & Dawbarn, Engineers, 82, Victoria-street, Westminster	July 29
Bridge Over Railway at Twist-street	do.	do.	do.
*Improvements at Shire Hall	Essex County Council	F. Whitmore, Architect, Duke-street, Chelmsford	July 21
*Erection of a Police Station	do.	do.	do.
Five Houses at Murrell Hill	.....	Ryan & Co.'s, Devonshire-street, Carlisle	No date.
One House in Thirlwell-terrace	.....	do.	do.
Cemetery Lodge	Burtonwood Parish Council	Clerk's Office, White House, Burtonwood	do.
Paper Lead-Covered Cables	Newport County Borough	H. Collings Bishop, Town Hall, Newport	do.
Timber for Manual Instruction Centres	Birmingham Education Committee	Education Department, Edmund-street, Birmingham	do.
Pair of Steel Dock Gates, Hull Central Dry Dock	.....	G. K. Waghorn, Contractor's Office, Humber-street, Hull	do.
*Wood Paving Works	Paddington Borough Council	Borough Surveyor, Town Hall, Paddington, W.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*Building Surveyor	Derbyshire Education Committee	Not Stated	June 30
*Quantity Surveyor	Acton U.D.C.	(See Advertisement this Issue)	July 4
*Assistant Civil Engineer	Civil Service Commissioners	Not Stated	July 7
*Architect	Heston & Isleworth U.D. Edu. Com.	300*l.* per annum	July 8

Those marked with an asterisk (*) are advertised in this Number. *Competitions*, iv. *Contracts*, iv. vi. viii. x. *Public Appointments*, xx.

TENDERS.—*Continued from page* 703.

LONDON.—For paving Warwick-place west mews, for the Westminster City Council. Total area about 280 yds. super.:—

	Per yd. super. s.	d.
French Asphalte Co.	11	6
Limmer Asphalte Paving Co.	12	0
London Asphalte Co.*	11	0
Trinided Lake Asphalte Co.	11	0

LONDON.—For new premises, Rochester-row, Westminster, for Messrs. W. Morris & Co. Mr. Arthur Keen, architect, 4, Raymond-buildings, Gray's-inn, W.C.:—

W. Johnson & Co.	£9,895	Patman & Fotheringham	£9,173
Martin, Wells, & Co.	9,873	J. Carmichael	9,160
J. Barker & Co.	9,650	Higgs & Hill	8,984
H. Roffey	9,568	Battley, Sons, & Holmes	8,847
J. Longley & Co.	9,549	Dove Bros.	8,585
Holliday & Greenwood	9,249	A. J. Bateman	8,534
Mattock Bros.	9,236		
F. G. Minter	9,179		

LONDON.—For roadworks, Coppett's-road, Muswell Hill, for the Town Council of Borough of Hornsey. Mr. E. J. Lovegrove, Borough Engineer and Surveyor, Municipal Offices, Southwood-lane, Highgate, N.:—

J. A. Dunnore	£5,646 1 9	T. Adams	£4,323 5 11
R. Ballard, Ltd.	4,975 16 0	Harvey, Bros., 25, Victoria-street, S.W.*	3,943 0 0
D. R. Paterson	4,812 0 0		
W. Griffiths & Co.	4,734 18 0		

LONDON.—For the construction of new river appliance for the London County Council:—

Pumps, Including Stop-Valve on Each Pump, and Monitors with Sluice Valves.

Shand, Mason & Co.	2,018
Merryweather & Sons, Ltd.*	£1,640

Suction and Delivery Pipes, Steam and Exhaust Pipes, Valves, etc., as per Specification, including Fitting at Wyvenhoe of Pumps and Gear.*

Merryweather & Sons, Ltd.	£752	Shand, Mason & Co.	£658
		Forrestt & Son, Ltd.*	600

LONDON.—For making-up carriageway of Woodlawn-road (Section III.), for the Fulham Borough Council. Mr. F. Wood, Borough Surveyor, Town Hall, Fulham, S.W.:—

Roadway.

D. R. Paterson	£550 0 0	F. Fowles*	£480 0 0
J. Mears	502 0 0	E. Parry & Co.	480 0 0
H. J. Greenham	500 0 0	G. W. Wimpey & Co.	480 0 0
B. Nowell & Co.	493 0 0		

Footways.

Harvey Bros. (York stone)	£170 8 0
Harvey Bros. (imperial stone)	149 16 3
Harvey Bros. (Victoria stone)	141 0 0
Harvey Bros. (patent adamant stone)	141 0 0
Borough Surveyor (clinker flags)*	120 0 0
Imperial Stone Co. (imperial stone)	119 0 0
J. Ellis & Co., Ltd. (indurated stone)	117 15 0
F. Fowles (patent Alexandra stone)	116 15 0
Croft Granite, Brick, & Concrete Co., Ltd. (Croft adamant flags)	113 0 0
Harvey Bros. (2-in. shap stone)	105 15 0
H. J. Greenham‡	—
D. R. Paterson§	—

‡ No deposit. § No deposit.

LONDON.—For making-up carriageway of Macmurdo-road, Fulham, for the Fulham Borough Council. Mr. F. Wood, Borough Surveyor, Town Hall, Fulham, S.W.:—

Roadway.

D. R. Paterson‡	£573 19 2	J. Mears‡	£525 0 0
G. W. Wimpey & Co.	530 0 0	E. Parry & Co.	520 0 0
B. Nowell & Co.	525 0 0	H. J. Greenham‡	515 0 0
		F. Fowles*	495 0 0

Footways.

Imperial Stone Co., Ltd. (imperial stone)‡ ..	£111 0 0
Borough Surveyor (clinker flags)*	110 0 0
J. Ellis & Co. (indurated stone)	105 15 0
Croft Granite, Brick, & Concrete Co., Ltd. (Croft adamant flags)‡	99 0 0

‡ No deposit.

LONDON.—For conversion of ground floor and basement, No. 2, Highbury-place, into offices. Messrs. Wagstaff & Sons, architects, Highbury Corner, N.:—

Bellew			£363 0
Wontners			517 0
Roberts	Structural	£422 0	457 10
	Decorative	35 10	
Goodman	Structural	398 18	431 18
	Decorative	33 0	
Stuart*	Structural	399 0	429 0
	Decorative	30 0	

NESS (near Nunnington, Yorks.).—For a steel lattice girder bridge, 50-ft. span, over river Rye, at Ness, for the Kirbymoorside Rural District Council. Mr. J. E. Parker, C.E., Post Office-chambers, Newcastle-on-Tyne:—

S. Parsons & Co., Ltd., Horton Ironworks, Bradford £670

SUTTON COLDFIELD.—For erecting a new town hall and fire brigade station in King Edward-square, for the Corporation. Messrs. Mawston & Eddison, architects, 7, Great James-street, Bedford-row, London. Quantities by Mr. Max Clarke:—

T. Elvino, Naden-road, Soho-hill, Birmingham* £10,100

SUTTON COLDFIELD.—For new town hall, etc., Sutton Coldfield. Mr. W. A. H. Clarry, Borough Surveyor, Council House, Sutton Coldfield:—

Turville & Son	£13,059 0 0	J. Parnell & Sons	£11,044 0 0
F. L. Jones..	12,326 0 0	W. Hopkins	11,000 0 0
A. N. Coles..	12,250 0 0	T. Lowe & Sons	10,997 0 0
T. Rawbotham	11,875 0 0	Whitehouse & Sons.....	10,923 0 0
J. Barnsley & Son	11,798 0 0	J. E. Johnson & Co. ...	10,877 0 0
S. Bastow & Co.	11,726 0 0	Gowing & Ingram ..	10,874 0 0
Streather & Hill	11,610 0 0	J. Bowen & Son	10,797 0 0
Whittall & Sons	11,600 0 0	W. Moss & Sons	10,767 0 0
White & Sons	11,534 0 0	J. E. Mocrhouse	10,755 0 0
W. Sapcote..	11,387 0 0	W. H. Gibbs	10,650 0 0
H. Willcock & Co.	11,337 0 0	C. Wright ..	10,430 0 0
A. E. Goff ..	11,286 9 7	J. Dallow & Sons	10,380 0 0
R. Fenwick, Ltd.	11,255 0 0	I. Langley ..	10,227 0 0
T. Johnson ..	11,247 0 0	T. Elvins* ..	10,100 0 0
J. H. Vickers, Ltd.	11,099 0 0	E. Crowder ..	10,099 0 0
W. H. James	11,090 0 0		

TEIGNMOUTH.—For alterations and additions to the County Council School, Brook-street, for the Devon County Council. Messrs. J. W. Rowell, Sons, & Locke, architects, Newton Abbot. Quantities by Mr. Vincent Cattermole Brown, of Paignton:—

E. Andrews ..	£3,498 16 0	W. E. Blake..	£2,870 0 0
H. Drew	3,150 0 0	F. C Francis, Teignmouth*	2,840 0 0
Parker Bros. .	2,998 0 0	F. J. Badcock	2,769 11 10
J. J. Hayman	2,925 9 4		
G. Lee	2,900 0 0		

TEDDINGTON.—For erecting a free public library adjoining the Council offices, for the Urban District Council. Mr. H. A. Cheers, architect, 35, Waldegrave Park, Twickenham:—

Gregor & Son	£4,545	Wheatley & Sons	£3,860
Foster Bros.	4,269	F. G. Minter.....	3,796
J. Cassé.....	4,256	Martin, Wells, & Co.	3,772
J. F. Collinson....	4,100	Wisdom Bros.	3,750
Munday & Sons ..	4,043	A. Faulks	3,720
W. J. Maddison ..	4,027	D. W. Barker	3,606
W. J. Renshaw ..	3,989	Gaze & Sons.....	3 957
W. J. Fryer & Co., Harrow-road, Paddington* ..	3,549	Lole & Lightfoot ..	3,934
		B. E. Nightingale	3,885
		Ferguson & Co. ..	3,866

TREDEGAR (Mon.).—For extensions and alterations to Bedwellty Union Workhouse, for the Guardians. Messrs. James & Morgan, architects, Charles-street-chambers, Cardiff:—

J. Allen & Sons	£29,097	6	10
J. Lewis & Sons	28,916	19	3
W. Symonds & Co.	28,472	13	1
J. Linton & Co.	27,250	0	0
W. Watts	27,136	0	0
Lattey & Co., Ltd.	26,911	3	10
C. Jenkins & Son	26,787	0	0
W. Williams	26,649	0	0
J. Newcombe	26,274	3	9
W. E. Willis	25,157	0	0
D. Davies	24,743	0	0
E. R. Evans Bros.	23,778	0	0
D. W. Davies, Cardiff*	23,218	10	0
W. Williams & Son‡			

‡ Not on proper form.

WALSALL.—For paving, etc., part of Charlotte-street and part of Dark-lane, for the Corporation. Mr. R. H. Middleton, Borough Surveyor:—

J. Atkins, Rycroft, Walsall £569

WALTHAMSTOW.—For alterations and additions to the Leyton, Walthamstow, and Wanstead Children's and General Hospital, Orford-road, for the Governors. Mr. J. Williams Dunford, architect, 100c, Queen Victoria-street, E.C.:—

Fuller & Son....	£296 0 0	Sands, Palmer, & Co.	£255 0 0
J. & J. Dean....	294 0 0	G. M. Page* ..	223 10 0
J. Reed	267 0 0		

[All of Walthamstow.]

WELLINGBOROUGH.—For alterations and repairs to farm buildings, Irthlingborough Grange, for the Urban District Council. Mr. J. E. H. De Key, architect, Wellingborough:—

F. Henson, Finedon, Wellingborough .. £112

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VOLUME LXXXVII

JULY to DEC 1904

THE BUILDER

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"Architecture can want no commendation, where there are noble men, or noble mindes."—SIR HENRY WOTTON.

"OUR English word To BUILD is the Anglo-Saxon Býlsan, to confirm, to establish, to make firm and sure and fast, to consolidate, to strengthen; and is applicable to all other things as well as to dwelling-places."—DIVERSIONS OF PURLEY.

"ALWAYS be ready to speak your mind, and a base man will avoid you."—WILLIAM BLAKE.

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